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The Works of E. P. Roe

VOLUME SEVENTEEN

SUCCESS WITH SMALL FRUITS

ILLUSTRATED

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I Dedicate this Book

TO

MR. CHARLES DOWNING

A Neighbor, Friend, and Horticulturist

FROM WHOM I SHALL ESTEEM IT A PRIVILEGE TO LEARN
IN COMING YEARS AS I HAVE IN THE PAST

PREFACE

A BOOK should be judged somewhat in view of what it attempts. One of the chief objects of this little volume is to lure men and women back to their original calling, that of gardening. I am decidedly under the impression that Eve helped Adam, especially as the sun declined. I am sure that they had small fruits for breakfast, dinner and supper, and would not be at all surprised if they ate some between meals. Even we poor mortals who have sinned more than once, and must give our minds to the effort not to appear unnatural in many hideous styles of dress, can fare as well. The Adams and Eves of every generation can have an Eden if they wish. Indeed, I know of many instances in which Eve creates a beautiful and fruitful garden without any help from Adam.

The theologians show that we have inherited much evil from our first parents, but, in the general disposition to have a garden, can we not recognize a redeeming ancestral trait? I would like to contribute my little share toward increasing this tendency, believing that as humanity goes back to its first occupation it may also acquire some of the primal gardener's characteristics before he listened to temptation and ceased to be even a gentleman. When he brutally blamed the woman, it was time he was turned out of Eden. All

the best things of the garden suggest refinement and courtesy. Nature might have contented herself with producing seeds only, but she accompanies the prosaic action with fragrant flowers and delicious fruit. It would be well to remember this in the ordinary courtesies of life.

Moreover, since the fruit-garden and farm do not develop in a straightforward, matter-of-fact way, why should I write about them after the formal and terse fashion of a manual or scientific treatise? The most productive varieties of fruit blossom and have some foliage which may not be very beautiful, any more than the departures from practical prose in this book are interesting; but, as a leafless plant or bush, laden with fruit, would appear gaunt and naked, so, to the writer, a book about them without any attempt at foliage and flowers would seem unnatural. The modern chronicler has transformed history into a fascinating story. Even science is now taught through the charms of fiction. Shall this department of knowledge, so generally useful, be left only to technical prose? Why should we not have a class of books as practical as the gardens, fields, and crops, concerning which they are written, and at the same time having much of the light, shade, color, and life of the out-of-door world? I merely claim that I have made an attempt in the right direction, but, like an unskillful artist, may have so coufused my lights, shades, and mixed my colors so badly, that my pictures resemble a strawberry-bed in which the weeds have the better of the fruit.

Liberal outlines of this work appeared in "Scribner's Magazine," but the larger scope afforded by the book has enabled me to treat many subjects for which there was no space in the magazine, and also to give my views more fully concerning topics only touched upon in the serial. As the

fruits described are being improved, so in the future other and more skillful horticulturists will develop the literature relating to them into its true proportions.

I am greatly indebted to the instruction received at various times from those venerable fathers and authorities on all questions relating to Eden-like pursuits—Mr. Chas. Downing of Newburg, and Hon. Marshall P. Wilder of Boston, Mr. J. J. Thomas, Dr. Geo. Thurber; to such valuable works as those of A. S. Fuller, A. J. Downing, P. Barry, J. M. Merrick, Jr.; and some English authors; to the live horticultural journals in the East, West, and South; and, last but not least, to many plain, practical fruit-growers who are as well informed and sensible as they are modest in expressing their opinions.

CORNWALL-ON-THE-HUDSON,
NEW YORK.

PREFACE TO THE NEW EDITION

On page 315 of this volume will be found the following words: "To attempt to describe all the strawberries that have been named would be a task almost as interminable as useless. This whole question of varieties presents a different phase every four or five years. Therefore I treat the subject in my final chapter in order that I may give revision, as often as there shall be occasion for it, without disturbing the body of the book. A few years since certain varieties were making almost as great a sensation as the Sharpless. They are now regarded as little better than weeds in most localities." Now that my publishers ask me to attempt this work of revision, I find that I shrink from it, for reasons natural and cogent to my mind. Possibly the reader may see them in the same light. The principles of cultivation, treatment of soils, fertilizing, etc., remain much the same. My words relating to these topics were penned when knowledge—the result of many years of practical experience—was fresh in memory. Subsequent observation has confirmed the views I then held, and, what is of far more weight in my estimation, they have been endorsed by the best and most thoroughly informed horticulturists in the land. I wrote what I then thought was true; I now read what has been declared true by highest authorities. I have more confidence in their judgment than in my own, and, having been so fortunate as to gain their approval, I fear to meddle with a record which, in a sense, has become theirs as well as mine. Therefore I have decided to leave the body of the book untouched.

When I read the lists of varieties I found many that have become obsolete, many that were never worthy of a name. Should I revise these lists, as I fully expected to do, from time to time? At present I have concluded that I will not, for the following reasons:

When, between six and seven years ago, I wrote the descriptions of the various kinds of fruit then in vogue, I naturally and inevitably reflected the small-fruit world as it then existed. The picture may have been imperfect and distorted, but I gave it as I saw it. With all its faults I would like to keep that picture for future reference. The time may come when none of the varieties then so highly praised and valued will be found in our fields or gardens. For that very reason I should like to look back to some fixed and objective point which would enable me to estimate the mutations which had occurred. Originators of new varieties are apt to speak too confidently and exultantly of their novelties; purchasers are prone to expect too much of them. Both might obtain useful lessons by turning to a record of equally lauded novelties of other days. Therefore I would like to leave that sketch of varieties as seen in 1880 unaltered. To change the figure, the record may become a landmark, enabling us to estimate future progress more accurately. Should the book still meet with the favor which has been accorded to it in the past, there can be frequent revisions of the supplemental lists which are now given. Although no longer engaged in the business of raising and selling plants, I have not lost my interest in the plants themselves. I hope to obtain much of my recreation in testing the new varieties offered from year to year. In engaging in such pursuits even the most cynical cannot suspect any other purpose than that of observing impartially the behavior of the varieties on trial.

I will maintain my grasp on the button-hole of the reader only long enough to state once more a pet theory—one which I hope for leisure to test at some future time. Far be it from me to decry the disposition to raise new seedling

varieties; by this course substantial progress has been and will be made. But there is another method of advance which may promise even better results.

In many of the catalogues of to-day we find many of the fine old varieties spoken of as enfeebled and fallen from their first estate. This is why they decline in popular favor and pass into oblivion. Little wonder that these varieties have become enfeebled, when we remember how ninety-nine hundredths of the plants are propagated. I will briefly apply my theory to one of the oldest kinds still in existence —Wilson's Albany. If I should set out a bed of Wilson's this spring, I would eventually discover a plant that surpassed the others in vigor and productiveness—one that to a greater degree than the others exhibited the true characteristics of the variety. I should then clear away all the other plants near it and let this one plant propagate itself, until there were enough runners for another bed. From this a second selection of the best and most characteristic plants would be made and treated in like manner. It appears to me reasonable and in accordance with nature that, by this careful and continued selection, an old variety could be brought to a point of excellence far surpassing its pristine condition, and that the higher and better strain would become fixed and uniform, unless it was again treated with the neglect which formerly caused the deterioration. By this method of selection and careful propagation the primal vigor shown by the varieties which justly become popular may be but the starting-point on a career of well-doing that can scarcely be limited. Is it asked, "Why is not this done by plant-growers?" You, my dear reader, may be one of the reasons. You may be ready to expend even a dollar a plant for some untested and possibly valueless novelty, and yet be unwilling to give a dollar a hundred for the best standard variety in existence. If I had Wilsons propagated as I have described, and asked ten dollars a thousand for them, nine out of ten would write back that they could buy the variety for two dollars per thousand. So they could; and they

could also buy horses at ten dollars each, and no one could deny that they were horses. One of the chief incentives of nurserymen to send out novelties is that they may have some plants for sale on which they can make a profit. When the people are educated up to the point of paying for quality in plants and trees as they are in respect to live-stock, there will be careful and capable men ready to supply the demand.

Beginning on page 349, the reader will find supplemental bits of varieties which have appeared to me worthy of mention at the present time. I may have erred in my selection of the newer candidates for favor, and have given some unwarranted impressions in regard to them. Let the reader remember the opinion of a veteran fruit-grower. "No true, accurate knowledge of a variety can be had," he said, "until it has been at least ten years in general cultivation."

I will now take my leave, in the hope that when I have something further to say, I shall not be unwelcome.

E. P. R.

CORNWALL-ON-THE-HUDSON, N. Y
January 16, 1886.

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SUCCESS WITH SMALL FRUITS

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CHAPTER I

PRELIMINARY PARLEY

IN the ages that were somewhat shadowed, to say the least, when Nature indulged her own wild moods in man and the world he trampled on rather than cultivated, there was a class who in their dreams and futile efforts became the unconscious prophets of our own time—the Alchemists. For centuries they believed they could transmute base metals into gold and silver. Modern knowledge enables us to work changes more beneficial than the alchemist ever dreamed of; and it shall be my aim to make one of these secrets as open as the sunlight in the fields and gardens wherein the beautiful mutations occur. To turn iron into gold would be a prosaic, barren process that might result in trouble to all concerned, but to transform heavy black earth and insipid rain-water into edible rubies, with celestial perfume and ambrosial flavor, is indeed an art that appeals to the entire race, and enlists that imperious nether organ which has never lost its power over heart or brain. As long, therefore, as humanity's mouth waters at the thought of morsels more delicious even than "sin under the tongue," I am sure of an audience when I discourse of strawberries and their kindred fruits. If apples led to the loss of Paradise, the reader will find described hereafter a list of fruits that will enable him to reconstruct a bit of Eden, even if the "Fall and all our woe" have left him possessed of merely a city yard. But land in the country, breezy hillsides, moist,

sheltered valleys, sunny plains—what opportunities for the divinest form of alchemy are here afforded to hundreds of thousands!

Many think of the soil only in connection with the sad words of the burial service—"Earth to earth, ashes to ashes." Let us, while we may, gain more cheerful associations with our kindred dust. For a time it can be earth to strawberry blossoms, ashes to bright red berries, and their color will get into our cheeks and their rich subacid juices into our insipid lives, constituting a mental, moral, and physical alterative that will so change us that we shall believe in evolution and imagine ourselves fit for a higher state of existence. One may delve in the earth so long as to lose all dread at the thought of sleeping in it at last; and the luscious fruits and bright-hued flowers that come out of it, in a way no one can find out, may teach our own resurrection more effectually than do the learned theologians.

We naturally feel that some good saints in the flesh, even though they are "pillars of the church," need more than a "sea-change" before they can become proper citizens of "Jerusalem the Golden;" but having compared a raspberry bush, bending gracefully under its delicious burden, with the insignificant seed from which it grew, we are ready to believe in all possibilities of good. Thus we may gather more than berries from our fruit-gardens. Nature hangs thoughts and suggestions on every spray, and blackberry bushes give many an impressive scratch to teach us that good and evil are very near together in this world, and that we must be careful, while seeking the one, to avoid the other. In every field of life those who seek the fruit too rashly are almost sure to have a thorny experience, and to learn that prickings are provided for those who have no consciences.

He who sees in the world around him only what strikes the eye lives in a poor, half-furnished house; he who obtains from his garden only what he can eat gathers but a meagre crop. If I find something besides berries on my vines, I shall pick it if so inclined. The scientific treatise,

or precise manual, may break up the well-rooted friendship of plants, and compel them to take leave of each other, after the arbitrary fashion of methodical minds, but I must talk about them very much as nature has taught me, since, in respect to out-of-door life, my education was acquired almost wholly in the old-fashioned way at the venerable "dame's school." Nay more, I claim that I have warrant to gather from my horticultural texts more than can be sent to the dining table or commission merchant. Such a matter-of-fact plant as the currant makes some attempt to embroider its humble life with ornament, and in April the bees will prove to you that honey may be gathered even from a gooseberry bush. Indeed, gooseberries are like some ladies that we all know. In their young and blossoming days they are sweet and pink-hued, and then they grow acid, pale, and hard; but in the ripening experience of later life they become sweet again and tender. Before they drop from their places the bees come back for honey, and find it.

In brief, I propose to take the reader on a quiet and extended ramble among the small fruits. It is much the same as if I said, "Let us go a-strawberrying together," and we talked as we went over hill and through dale in a style somewhat in harmony with our wanderings. Very many, no doubt, will glance at these introductory words, and decline to go with me, correctly feeling that they can find better company. Other busy, practical souls will prefer a more compact, straightforward treatise, that is like a lesson in a class-room, rather than a stroll in the fields, or a tour among the fruit farms, and while sorry to lose their company, I have no occasion to find fault.

I assure those, however, who, after this preliminary parley, decide to go further, that I will do my best to make our excursion pleasant, and to cause as little weariness as is possible, if we are to return with full baskets. I shall not follow the example of some thrifty people who invite one to go "a-berrying," but lead away from fruitful nooks, proposing to visit them alone by stealth. All the secrets I know

shall become open ones. I shall conduct the reader to all the "good places," and name the good things I have discovered in half a lifetime of research. I would, therefore, modestly hint to the practical reader—to whom "time is money," who has an eye to the fruit only, and with whom the question of outlay and return is ever uppermost—that he may, after all, find it to his advantage to go with us. While we stop to gather a flower, listen to a brook or bird, or go out of our way occasionally to get a view, he can jog on, meeting us at every point where we "mean business." These points shall occur so often that he will not lose as much time as he imagines, and I think he will find my business talks business-like—quite as practical as he desires.

To come down to the plainest of plain prose, I am not a theorist on these subjects, nor do I dabble in small fruits as a rich and fanciful amateur, to whom it is a matter of indifference whether his strawberries cost five cents or a dollar a quart. As a farmer, milk must be less expensive than champagne. I could not afford a fruit farm at all if it did not more than pay its way, and in order to win the confidence of the "solid men," who want no "gush" or side sentiment, even though nature suggests some warrant for it, I will give a bit of personal experience. Five years since, I bought a farm of twenty-three acres that for several years had been rented, depleted, and suffered to run wild. Thickets of brushwood extended from the fences well into the fields, and in a notable instance across the entire place. One portion was so stony that it could not be plowed; another so wet and sour that even grass would not grow upon it; a third portion was not only swampy, but liable to be overwhelmed with stones and gravel twice a year by the sudden rising of a mountain stream. There was no fruit on the place except apples and a very few pears and grapes. Nearly all of the land, as I found it, was too impoverished to produce a decent crop of strawberries. The location of the place, moreover, made it very expensive—it cost

$19,000; and yet during the third year of occupancy the income from this place approached very nearly to the outlay, and in 1878, during which my most expensive improvements were made, in the way of draining, taking out stones, etc., the income paid for these improvements, for current expenses, and gave a surplus of over $1,800. In 1879, the net income was considerably larger. In order that these statements may not mislead any one, I will add that in my judgment only the combined business of plants and fruit would warrant such expenses as I have incurred. My farm is almost in the midst of a village, and the buildings upon it greatly increased its cost. Those who propose to raise and sell fruit only should not burden themselves with high-priced land. Farms, even on the Hudson, can be bought at quite moderate prices at a mile or more away from centres, and yet within easy reach of landings and railroad depots.

Mr. Charles Downing, whose opinions on all horticultural questions are so justly valued, remarked to me that no other fruit was so affected by varying soils and climates as the strawberry. I have come to the conclusion that soil, locality, and climate make such vast differences that unless these variations are carefully studied and indicated, books will mislead more people than they help. A man may write a treatise admirably adapted to his own farm; but if one living a thousand, a hundred, or even one mile away, followed the same method, he might almost utterly fail. While certain general and foundation principles apply to the cultivation of each genus of fruit, important modifications and, in some instances, almost radical changes of method must be made in view of the varied conditions in which it is grown.

It is even more important to know what varieties are best adapted to different localities and soils. While no experienced and candid authority will speak confidently and precisely on this point, much very useful information and suggestion may be given by one who, instead of theorizing, observes, questions, and records facts as they are. The most

profitable strawberry of the far South will produce scarcely any fruit in the North, although the plant grows well; and some of our best raspberries cannot even exist in a hot climate or upon very light soils. In the preparation of this book it has been my aim to study these conditions, that I might give advice useful in Florida and Canada, New York and California, as well as at Cornwall. I have maintained an extensive correspondence with practical fruit growers in all sections, and have read with care contributions to the horticultural press from widely separated localities. Not content with this, I have visited in person the great fruit-growing centres of New Jersey, Norfolk and Richmond, Va.; Charleston, S. C.; Augusta and Savannah, Ga.; and several points in Florida. Thus, from actual observation and full, free conversation, I have familiarized myself with both the Northern and Southern aspects of this industry, while my correspondence from the far West, Southwest, and California will, I hope, enable me to aid the novice in those regions also.

I know in advance that my book will contain many and varied faults, but I intend that it shall be an expression of honest opinion. I do not like "foxy grapes" nor foxy words about them.

CHAPTER II

THE FRUIT GARDEN

Raison d'être

SMALL fruits, to people who live in the country, are like heaven—objects of universal desire and very general neglect. Indeed, in a land so peculiarly adapted to their cultivation, it is difficult to account for this neglect if you admit the premise that Americans are civilized and intellectual. It is the trait of a savage and inferior race to devour with immense gusto a delicious morsel, and then trust to luck for another. People who would turn away from a dish of "Monarch" strawberries, with their plump pink cheeks powdered with sugar, or from a plate of melting raspberries and cream, would be regarded as so eccentric as to suggest an asylum; but the number of professedly intelligent and moral folk who ignore the simple means of enjoying the ambrosial viands daily, for weeks together, is so large as to shake one's confidence in human nature. A well-maintained fruit garden is a comparatively rare adjunct of even stylish and pretentious homes. In June, of all months, in sultry July and August, there arises from innumerable country breakfast tables the pungent odor of a meat into which the devils went but out of which there is no proof they ever came. From the garden under the windows might have been gathered fruits whose aroma would have tempted spirits of the air. The cabbage-patch may be seen afar, but too often the strawberry-bed even if it exists is hidden by weeds, and the later small fruits struggle for bare life in some neglected corner. Indeed, an excursion into certain parts of New England might suggest that many of its thrifty

citizens would not have been content in Eden until they had put its best land into onions and tobacco. Through the superb scenery of Vermont there flows a river whose name, one might think, would secure an unfailing tide from the eyes of the inhabitants. The Alpine strawberry grows wild in all that region, but the puritan smacked his lips over another gift of nature and named the romantic stream in its honor. To account for certain tastes or tendencies, mankind must certainly have fallen a little way, or, if Mr. Darwin's view is correct, and we are on a slight up-grade, a dreadful hitch and tendency to backslide has been apparent at a certain point ever since the Hebrews sighed for the "leeks and onions of Egypt."

Of course, there is little hope for the rural soul that "loathes" the light manna of small fruits. We must leave it to evolution for another cycle or two. But, as already indicated, we believe that humanity in the main has reached a point where its internal organs highly approve of the delicious group of fruits that strayed out of Paradise, and have not yet lost themselves among the "thorns and thistles." Indeed, modern skill—the alchemy of our age—has wrought such wonders that Eden is possible again to all who will take the trouble to form Eden-like tastes and capacities.

The number who are doing this is increasing every year. The large demand for literature relating to out-of-door life, horticultural journals, like the fruits of which they treat, flourishing in regions new and remote, are proof of this. The business of supplying fruit-trees, plants, and even flowers, is becoming a vast industry. I have been informed that one enterprising firm annually spends thousands in advertising roses only.

But while we welcome the evidences that so many are ceasing to be bucolic heathen, much observation has shown that the need of further enlightenment is large indeed. It is depressing to think of the number of homes about which fruits are conspicuous only by their absence—homes of every class, from the laborer's cottage and pioneer's cabin

to the suburban palace. Living without books and pictures is only a little worse than living in the country without fruits and flowers. We must respect to some extent the old ascetics, who, in obedience to mistaken ideas of duty, deprived themselves of the good things God provided, even while we recognize the stupidity of such a course. Little children are rarely so lacking in sense as to try to please their father by contemptuously turning away from his best gifts, or by treating them with indifference. Why do millions live in the country, year after year, raising weeds and brambles, or a few coarse vegetables, when the choicest fruits would grow almost as readily? They can plead no perverted sense of duty.

It is a question hard to answer. Some, perhaps, have the delusion that fine small fruits are as difficult to raise as orchids. They class them with hot-house grapes. Others think they need so little attention that they can stick a few plants in hard, poor ground and leave them to their fate. One might as well try to raise canary-birds and kittens together as strawberries and weeds. There is a large class who believe in small fruits, and know their value. They enjoy them amazingly at a friend's table, and even buy some when they are cheap. A little greater outlay and a little intelligent effort would give them an abundant supply from their own grounds. In a vague way they are aware of this, and reproach themselves for their negligence, but time passes and there is no change for the better. Why? I don't know. There are men who rarely kiss their wives and children. For them the birds sing unheeded and even unheard; flowers become mere objects, and sunsets suggest only "quitting time." In theory they believe in all these things. What can be said of them save that they simply jog on to-day as they did yesterday, ever dimly hoping at some time or other "to live up to their privileges"? But they usually go on from bad to worse, until, like their neglected strawberry-beds, they are "turned under."

In cities not a hundred miles from my farm there are

abodes of wealth with spacious grounds, where, in many instances, scarcely any place is found for small fruits. "It is cheaper and easier to buy them," it is said. This is a sorry proof of civilization. There is no economy in the barbaric splendor of brass buttons and livery, but merely a little trouble (I doubt about money) is saved on the choicest luxuries of the year. The idea of going out of their rural paradises to buy half-stale fruit! But this class is largely at the mercy of the "hired man," or his more disagreeable development, the pretentious smatterer, who, so far from possessing the knowledge that the English, Scotch, or German gardeners acquire in their long, thorough training, is a compound of ignorance and prejudice. To hide his barrenness of mind he gives his soul to rare plants, clipped lawns, but stints the family in all things save his impudence. If he tells his obsequious employers that it is easier and cheaper to buy their fruit than to raise it, of course there is naught to do but go to the market and pick up what they can; and yet Dr. Thurber says, with a vast deal of force, that "the unfortunate people who buy their fruit do not know what a strawberry is."

In all truth and soberness it is a marvel and a shame that so many sane people who profess to have passed beyond the habits of the wilderness will not give the attention required by these unexacting fruits. The man who has learned to write his name can learn to raise them successfully. The ladies who know how to keep their homes neat through the labors of their "intelligent help," could also learn to manage a fruit garden even though employing the stupidest oaf that ever blundered through life. The method is this: First learn how yourself, and then let your laborer thoroughly understand that he gets no wages unless he does as he is told. In the complicated details of a plant farm there is much that needs constant supervision, but the work of an ordinary fruit garden is, in the main, straightforward and simple. The expenditure of a little time, money, and, above all things, of seasonable labor, is so abundantly re-

paid that one would think that bare self-interest would solve invariably the simple problem of supply.

As mere articles of food, these fruits are exceedingly valuable. They are capable of sustaining severe and continued labor. For months together we might become almost independent of butcher and doctor if we made our places produce all that nature permits. Purple grapes will hide unsightly buildings; currants, raspberries, and blackberries will grow along the fences and in the corners that are left to burdocks and brambles. I have known invalids to improve from the first day that berries were brought to the table, and thousands would exchange their sallow complexions, sick headaches, and general ennui for a breezy interest in life and its abounding pleasures, if they would only take nature's palpable hint, and enjoy the seasonable food she provides. Belles can find better cosmetics in the fruit garden than on their toilet tables, and she who paints her cheeks with the pure, healthful blood that is made from nature's choicest gifts, and the exercise of gathering them, can give her lover a kiss that will make him wish for another.

The famous Dr. Hosack, of New York City, who attended Alexander Hamilton after he received his fatal wound from Burr, was an enthusiast on the subject of fruits. It was his custom to terminate his spring course of lectures with a strawberry festival. "I must let the class see," he said, "that we are practical as well as theoretical. Linnaeus cured his gout and protracted his life by eating strawberries."

"They are a dear article," a friend remarked, "to gratify the appetites of so many."

"Yes, indeed," replied the doctor, "but from our present mode of culture they will become cheap."

It is hard to realize how scarce this fruit was sixty or seventy years ago, but the prediction of the sagacious physician has been verified even beyond his imagination. Strawberries are raised almost as abundantly as potatoes, and for a month or more can be eaten as a cheap and wholesome food by all classes, even the poorest. By a proper selec-

tion of varieties we, in our home, feast upon them six weeks together, and so might the majority of those whose happy lot is cast in the country. The small area of a city yard planted with a few choice kinds will often yield surprising returns under sensible culture.

If we cultivate these beautiful and delicious fruits we always have the power of giving pleasure to others, and he's a churl and she a pale reflection of Xantippe who does not covet this power. The faces of our guests brighten as they snuff from afar the delicate aroma. Our vines can furnish gifts that our friends will ever welcome; and by means of their products we can pay homage to genius that will be far more grateful than commonplace compliments. I have seen a letter from the Hon. Wm. C. Bryant, which is a rich return for the few strawberries that were sent to him, and the thought that they gave him pleasure gives the donor far more. They are a gift that one can bestow and another take without involving any compromise on either side, since they belong to the same category as smiles, kind words, and the universal freemasonry of friendship. Faces grow radiant over a basket of fruit or flowers that would darken with anger at other gifts.

If, in the circle of our acquaintance, there are those shut up to the weariness and heavy atmosphere of a sick-room, in no way can we send a ray of sunlight athwart their pallid faces more effectually than by placing a basket of fragrant fruit on the table beside them. Even though the physician may render it "forbidden fruit," their eyes will feast upon it, and the aroma will teach them that the world is not passing on, unheeding and uncaring whether they live or die.

The Fruit and Flower Mission of New York is engaged in a beautiful and most useful charity. Into tenement-houses and the hot close wards of city hospitals, true sisters of mercy of the one Catholic church of love and kindness carry the fragrant emblems of an Eden that was lost, but may be regained even by those who have wandered farthest from its beauty and purity. Men and women, with faces

seemingly hardened and grown rigid under the impress of vice, that but too correctly reveal the coarse and brutal nature within, often become wistful and tender over some simple flower or luscious fruit that recalls earlier and happier days. These are gifts which offend no prejudices, and inevitably suggest that which is good, sweet, wholesome and pure. For a moment, at least, and perhaps forever, they may lead stained and debased creatures to turn their faces heavenward. There are little suffering children also in the hospitals; there are exiles from country homes and country life in the city who have been swept down not by evil but the dark tides of disaster, poverty, and disease, and to such it is a privilege as well as a pleasure to send gifts that will tend to revive hope and courage. That we may often avail ourselves of these gracious opportunities of giving the equivalent of a "cup of cold water," we should plant fruits and flowers in abundance.

One of the sad features of our time is the tendency of young people to leave their country homes. And too often one does not need to look far for the reason. Life at the farm-house sinks into deep ruts, and becomes weary plodding. There are too many "one-ideaed" farmers and farms. It is corn, potatoes, wheat, butter, or milk. The staple production absorbs all thought and everything else is neglected. Nature demands that young people should have variety, and furnishes it in abundance. The stolid farmer too often ignores nature and the cravings of youth, and insists on the heavy monotonous work of his specialty, early and late, the year around, and then wonders why in his declining years there are no strong young hands to lighten his toil. The boy who might have lived a sturdy, healthful, independent life among his native hills is a bleached and sallow youth measuring ribbons and calicoes behind a city counter. The girl who might have been the mistress of a tree-shadowed country house disappears under much darker shadows in town. But for their early home life, so meagre

and devoid of interest, they might have breathed pure air all their days.

Not the least among the means of making a home attractive would be a well-maintained fruit garden. The heart and the stomach have been found nearer together by the metaphysicians than the physiologists, and if the "housemother," as the Germans say, beamed often at her children over a great dish of berries flanked by a pitcher of unskimmed milk, not only good blood and good feeling would be developed, but something that the poets call "early ties."

There is one form of gambling or speculation that, within proper limits, is entirely innocent and healthful—the raising of new seedling fruits and the testing of new varieties. In these pursuits the elements of chance, skill, and judgment enter so evenly that they are an unfailing source of pleasurable excitement. The catalogues of plant, tree, and seed dealers abound in novelties. The majority of them cannot endure the test of being grown by the side of our well-known standard kinds, but now and then an exceedingly valuable variety, remarkable for certain qualities or peculiarly adapted to special localities and uses, is developed. There is not only an unfailing pleasure in making these discoveries, but often a large profit. If, three or four years ago, a country boy had bought a dozen Sharpless strawberry plants, and propagated from them, he might now obtain several hundred dollars from their increased numbers. Time only can show whether this novelty will become a standard variety, but at present the plants are in great demand.

The young people of a country home may become deeply interested in originating new seedlings. A thousand strawberry seeds will produce a thousand new kinds, and, although the prospects are that none of them will equal those now in favor, something very fine and superior may be obtained. Be this as it may, if these simple natural interests prevent boys and girls from being drawn into the maelstrom of city life until character is formed, each plant will have a value beyond silver or gold.

One of the supreme rewards of human endeavor is a true home, and surely it is as stupid as it is wrong to neglect some of the simplest and yet most effectual means of securing this crown of earthly life. A home is the product of many and varied causes, but I have yet to see the man who will deny that delicious small fruits for eight months of the year, and the richer pleasure even of cultivating and gathering them, may become one of the chief contributions to this result. I use the words "eight months" advisedly, for even now, January 29, we are enjoying grapes that were buried in the ground last October. I suppose my children are very material and unlike the good little people who do not live long, but they place a white mark against the days on which we unearth a jar of grapes.

CHAPTER III

SMALL FRUIT FARMING AND ITS PROFITS

A FARM without a fruit garden may justly be regarded as proof of a low state of civilization in the farmer. No country home should be without such simple means of health and happiness. For obvious reasons, however, there is not, and never can be, the same room for fruit raising as there is for grain, grass, and stock farming. Nevertheless, the opportunities to engage with profit in this industry on a large scale are increasing every year. From being a luxury of a few, the small fruits have become an article of daily food to the million. Even the country village must have its supply, and the number of crates that are shipped from New York city to neighboring towns is astonishingly large. As an illustration of the rapidly enlarging demand for these fruits, let us consider the experience of one Western city, Cincinnati. Mr. W. H. Corbly, who is there regarded as one of the best informed on these subjects, has gathered the following statistics: "In 1835 it was regarded as a most wonderful thing that 100 bushels of strawberries could be disposed of on the Cincinnati market in one day, and was commented on as a great event. A close estimate shows that during the summer of 1879 eighty to eighty-five thousand bushels of strawberries were sold in Cincinnati. Of course, a large part of these berries were shipped away, but it is estimated that nearly one half were consumed here. About the year 1838 the cultivation of black raspberries was commenced in this county by James Gallagher and F. A. McCormick of Salem, Anderson township. The first

year, Gallagher's largest shipment in one day was six bushels, and McCormick's four. When they were placed on the market, McCormick sold out at 6¼ cents per quart, and Gallagher held off till McCormick had sold out, when he put his on sale and obtained 8⅛ cents per quart, and the demand was fully supplied. It is estimated that the crop for the year 1879, handled in Cincinnati, amounted to from seventy-five thousand to eighty thousand bushels—the crop being a fairly good one—selling at an average of about two dollars per bushel." It has been stated in "The Country Gentleman" that about $5,000,000 worth of small fruits were sold in Michigan in one year; and the same authority estimates that $25,000,000 worth are consumed annually in New York city. In the future it would seem that this demand would increase even more rapidly; for in every fruit-growing region immense canning establishments are coming into existence, to which the markets of the world are open. Therefore, in addition to the thousands already embarked in this industry, still larger numbers will engage in it during the next few years.

Those who now for the first time are turning their attention toward this occupation may be divided mainly into two classes. The first consists of established farmers, who, finding markets within their reach, extend their patches of raspberries, currants, or strawberries to such a degree that they have a surplus to sell. To the extent that such sales are remunerative, they increase the area of fruits, until in many instances they become virtually fruit farmers. More often a few acres are devoted to horticulture, and the rest of the farm is carried on in the old way.

The second class is made up chiefly of those who are unfamiliar with the soil and its culture—mechanics, professional men, who hope to regain health by coming back to nature, and citizens whose ill-success or instincts suggest country life and labors. From both these classes, and especially from the latter, I receive very many letters, containing all kinds of questions. The chief burden on most

minds, however, is summed up in the words, "Do small fruits pay?" To meet the needs of these two classes is one of the great aims of this work; and it is my most earnest wish not to mislead by high-colored pictures.

Small fruits pay many people well; and unless location, soil, or climate is hopelessly against one, the degree of profit will depend chiefly upon his skill, judgment and industry. The raising of small fruits is like other callings, in which some are getting rich, more earning a fair livelihood, and not a few failing. It is a business in which there is an abundance of sharp, keen competition; and ignorance, poor judgment, and shiftless, idle ways will be as fatal as in the workshop, store, or office.

Innumerable failures result from inexperience. I will give one extreme example, which may serve to illustrate the sanguine mental condition of many who read of large returns in fruit culture. A young man who had inherited a few hundred dollars wrote me that he could hire a piece of land for a certain amount, and he wished to invest the balance—every cent—in plants, thus leaving himself no capital with which to continue operations, but expecting that a speedy crop would lift him at once into a prosperous career. I wrote that under the circumstances I could not supply him—that it would be about the same as robbery to do so; and advised him to spend several years with a practical and successful fruit grower and learn the business.

Most people enter upon this calling in the form of a wedge; but only too many commence at the blunt end, investing largely at once in everything, and therefore their business soon tapers down to nothing. The wise begin at the point of the wedge and develop their calling naturally, healthfully—learning, by experience and careful observation, how to grow fruits profitably, and which kinds pay the best. There ought also to be considerable capital to start with, and an absence of the crushing burden of interest money. No fruits yield any returns before the second or third year; and there are often unfavorable seasons and glutted mar-

kets. Nature's prizes are won by patient, persistent industry, and not by Wall Street sleight of hand.

Location is very important. A fancy store, however well-furnished, would be a ruinous investment at a country cross-road. The fruit farm must be situated where there is quick and cheap access to good markets, and often the very best market may be found at a neighboring village, summer resort, or canning establishment. Enterprise and industry, however, seem to surmount all obstacles. The Rev. Mr. Knox shipped his famous "700" strawberries (afterward known to be the Jucunda, a foreign variety) from Pittsburg to New York, securing large returns; and, take the country over, the most successful fruit farms seem to be located where live men live and work. Still, if one were about to purchase, sound judgment would suggest a very careful choice of locality with speedy access to good markets. Mr. J. J. Thomas, editor of "The Country Gentleman," in a paper upon the Outlook of Fruit Culture, read before the Western N. Y. Horticultural Society, laid down three essentials to success: 1. Locality—a region found by experience to be adapted to fruit growing. 2. Wise selection of varieties of each kind. 3. Care and culture of these varieties. He certainly is excellent authority.

These obvious considerations, and the facts that have been instanced, make it clear that brains must unite with labor and capital. Above all, however, there must be trained, practical skill. Those succeed who learn how; and to add a little deftness to unskilled hands is the object of every succeeding page. At the same time, I frankly admit that nothing can take the place of experience. I once asked an eminent physician if a careful reading of the best medical text-books and thorough knowledge of the materia medica could take the place of daily study of actual disease and fit a man for practice, and he emphatically answered, "No!" It is equally true that an intelligent man can familiarize himself with every horticultural writer from the classic age to our own and yet be outstripped in success by an ignorant Irish

laborer who has learned the little he knows in the school of experience. The probabilities are, however, that the laborer will remain such all his days, while the thoughtful, reading man, who is too sensible to be carried away by theories, and who supplements his science with experience, may enrich not only himself but the world.

Still, there is no doubt that the chances of success are largely in favor of the class I first named,—the farmers who turn their attention in part or wholly toward fruit growing. They are accustomed to hard out-of-door work and the general principles of agriculture. The first is always essential to success; and a good farmer can soon become equally skillful in the care of fruits if he gives his mind to their culture. The heavy, stupid, prejudiced plodder who thinks a thing is right solely because his grandfather did it, is a bucolic monster that is receding so fast into remote wilds before the horticultural press that he scarcely need be taken into account. Therefore, the citizen or professional man inclined to engage in fruit farming should remember that he must compete with the hardy, intelligent sons of the soil, who in most instances are crowning their practical experience with careful reading. I do not say this to discourage any one, but only to secure a thoughtful and adequate consideration of the subject before the small accumulations of years are embarked in what may be a very doubtful venture. Many have been misled to heavy loss by enthusiastic works on horticulture; I wish my little book to lead only to success.

If white-handed, hollow-chested professional men anxious to acquire money, muscle, and health by fruit raising,—if citizens disgusted with pavements and crowds are willing to take counsel of common-sense and learn the business practically and thoroughly, why should they not succeed? But let no one imagine that horticulture is the final resort of ignorance, indolence, or incapacity, physical or mental. Impostors palm themselves off on the world daily; a credulous public takes poisonous nostrums by the ton and butt;

but Nature recognizes error every time, and quietly thwarts those who try to wrong her, either wilfully or blunderingly.

Mr. Peter Henderson, who has been engaged practically in vegetable gardening for over a quarter of a century, states, as a result of his experience, that capital, at the rate of $300 per acre, is required in starting a "truck farm," and that the great majority fail who make the attempt with less means. In my opinion, the fruit farmer would require capital in like proportion; for, while many of the small fruits can be grown with less preparation of soil and outlay in manure, the returns come more slowly, since, with the exception of strawberries, none of them yield a full crop until the third or fourth year. I advise most urgently against the incurring of heavy debts. Better begin with three acres than thirty, or three hundred, from which a large sum of interest money must be obtained before a penny can be used for other purposes. Anything can be raised from a farm easier than a mortgage.

Success depends very largely, also, on the character of the soil. If it is so high and dry as to suffer severely from drought two years out of three, it cannot be made to pay except by irrigation; if so low as to be wet, rather than moist, the prospects are but little better. Those who are permanently settled must do their best with such land as they have, and in a later chapter I shall suggest how differing soils should be managed. To those who can still choose their location, I would recommend a deep mellow loam, with a rather compact subsoil,—moist, but capable of thorough drainage. Diversity of soil and exposure offer peculiar advantages also. Some fruits thrive best in a stiff clay, others in sandy upland. Early varieties ripen earlier on a sunny slope, while a late kind is rendered later on a northern hillside, or in the partial shade of a grove. In treating each fruit and variety, I shall try to indicate the soils and exposures to which they are best adapted.

Profits.—The reader will naturally wish for some definite statements of the profits of fruit farming; but I almost hesi-

tate to comply with this desire. A gentleman wrote to me that he sold from an acre of Cuthbert raspberries $800 worth of fruit. In view of this fact, not a few will sit down and begin to figure,—"If one acre yielded $800, ten acres would produce $8,000; twenty acres $16,000," etc. Multitudes have been led into trouble by this kind of reasoning. The capacity of an engine with a given motor power can be measured, and certain and unvarying results predicted; but who can measure the resources of an acre through varying seasons and under differing culture, or foretell the price of the crops? In estimating future profits, we can only approximate; and the following records are given merely to show what results have been secured, and therefore may be obtained again, and even surpassed. "The Country Gentleman" gives a well-authenticated instance of a fruit grower who "received more than $2,000 from three acres of strawberries." In contrast, however, it could be shown that many fields have not paid expenses. I once had such an experience. The market was "glutted," and the variety yielded berries so small and poor that they did not average five cents per quart. Occasionally we hear of immense shipments from the South being thrown into the dock.

Mr. William Parry, a veteran fruit grower in New Jersey, states the truth I wish to convey very clearly, and gives a fair mean between these two extremes:

"YIELD AND PROFIT

"There are so many circumstances connected with strawberry growing, such as varieties, soil, climate, location, markets, and the skill and management of the grower, that the results of a few cases cannot be relied on for general rules.

"We have grown over two hundred bushels per acre here, and realized upward of six hundred dollars per acre for the crop; but that is much above the general average. Having kept a careful record, for fourteen years past, of the yield per acre and price per quart at which our strawberries have been sold, we find the average to be about 2,500 quarts per acre, and the price eleven cents per quart in market, giving the following results:

"Commissions, 10 per cent	$27.50
Picking 2,500 quarts, at 2c. per quart	50.00
Manure	17.50
Use of baskets	10.00
Cultivation, etc.	25.00
Net profits per acre	145.00
"Gross proceeds, 2,500 quarts at 11c.	$275.00"

In the year 1876 the same gentleman had ten acres of Brandywine raspberries that yielded about eighty-two bushels to the acre, giving a clear profit of $280, or of $2,800 for the entire area. This crop, so far from being the average, was awarded a premium as the most profitable that year in the section.

J. R. Gaston & Sons, of Normal, Ill., have given the following record of a plantation of Snyder blackberries: "We commenced to pick a field of seven acres July 12th, and finished picking August 22. The total amount gathered was 43,575 quarts, equal to 1,361 bushels and 22 quarts. The average price was eight cents per quart, making the gross proceeds equal to $3,486. We paid for picking $435.75. The cost of trimming and cultivating was about $400; cost of boxes, crates, and marketing was $1,307.25, leaving a net profit of $1,343."

A gentleman in Ulster Co., N. Y., stated that 200 bushes of the Cherry currant yielded him in one season 1,000 lbs. of fruit, which was sold at an average of eight cents per pound. His gross receipts were $80 from one-fourteenth of an acre, and at the same ratio an acre would have yielded $1,120. Is this an average yield? So far from it, there are many acres of currants and gooseberries that do not pay expenses. Thus it can be seen that the scale ranges from marvellous prizes down to blanks and heavy losses; but the drawing is not a game of chance, but usually the result of skill and industry, or their reverse.

I might have given many examples of large, and even enormously large, profits obtained under exceptional circum-

stances; but they tend to mislead. I write for those whose hearts prompt them to co-work with nature, and who are most happy when doing her bidding in the breezy fields and gardens, content with fair rewards, instead of being consumed by the gambler's greed for unearned gold. At the same time, I am decidedly in favor of high culture, and the most generous enriching of the soil; convinced that fruit growers and farmers in general would make far more money if they spent upon one acre what they usually expend on three. In a later chapter will be found an instance of an expenditure of $350 per acre on strawberry land, and the net profits obtained were proportionately large.

CHAPTER IV

STRAWBERRIES: THE FIVE SPECIES AND THEIR HISTORY

THE conscientious Diedrich Knickerbocker, that venerated historian from whom all good citizens of New York obtain the first impressions of their ancestry, felt that he had no right to chronicle the vicissitudes of Manhattan Island until he had first accounted for the universe of which it is a part. Equally with the important bit of land named, the strawberry belongs to the existing cosmos, and might be traced back to "old chaos." I hasten to re-assure the dismayed reader. I shall not presume to follow one who could illumine his page with genius, and whose extensive learning enabled him to account for the universe not merely in one but in half a dozen ways.

It is the tendency of the present age to ask what is, not what has been or shall be. And yet, on the part of some, as they deliberately enjoy a saucer of strawberries and cream, —it is a pleasure that we prolong for obvious reasons,—a languid curiosity may arise as to the origin and history of so delicious a fruit. I suppose Mr. Darwin would say, "it was evolved." But some specimens between our lips suggest that a Geneva watch could put itself together quite as readily. At the same time, it must be said that our "rude forefathers" did not eat Monarch or Charles Downing strawberries. In few fruits, probably, have there been such vast changes or improvements as in this. Therefore, I shall answer briefly and as well as I can, in view of the meagre data and conflicting opinions of the authorities, the curiosity that I have imagined on some faces. Those who care only for the strawberry of to-day can easily skip a few pages.

If there were as much doubt about a crop of this fruit as concerning the origin of its name, the outlook would be dismal, indeed. In old Saxon, the word was streawberige or streowberrie; and was so named, says one authority, "from the straw-like stems of the plant, or from the berries lying strewn upon the ground." Another authority tells us: "It is an old English practice" (let us hope a modern one also) "to lay straw between the rows to preserve the fruit from rotting on the wet ground, from which the name has been supposed to be derived; although more probably it is from the wandering habit of the plant, straw being a corruption of the Anglo-Saxon strae, from which we have the English verb stray." Again tradition asserts that in the olden times children strung the berries on straws for sale, and hence the name. Several other causes have been suggested, but I forbear. I have never known, however, a person to decline the fruit on the ground of this obscurity and doubt. (Controversialists and sceptics please take note.)

That the strawberry should belong to the rose family, and that its botanical name should be fragaria, from the Latin fragro, to smell sweetly, will seem both natural and appropriate.

While for his knowledge of the plant I refer the reader to every hillside and field (would that I might say, to every garden!), there is a peculiarity in the production of the fruit which should not pass unnoted. Strictly speaking, the small seeds scattered over the surface of the berry are the fruit, and it is to perfect these seeds that the plants blossom, the stamens scatter, and the pistils receive the pollen on the convex receptacle, which, as the seeds ripen, greatly enlarges, and becomes the pulpy and delicious mass that is popularly regarded as the fruit. So far from being the fruit, it is only "the much altered end of the stem" that sustains the fruit or seeds; and so it becomes a beautiful illustration of a kindly, genuine courtesy, which renders an ordinary service with so much grace and graciousness that we dwell on the manner with far more pleasure than on the service itself.

The innumerable varieties of strawberries that are now in existence appear, either in their character or origin, to belong to five great and quite distinct species. The first, and for a long time the only one of which we have any record, is the Fragaria vesca, or the "Alpine" strawberry. It is one of the most widely spread fruits of the world, for it grows, and for centuries has grown, wild throughout Northern and Central Europe and Asia, following the mountains far to the south; and on this continent, from time immemorial, the Indian children have gathered it, from the Northern Atlantic to the Pacific. In England this species exhibits some

SEEDS AND PULP OF THE STRAWBERRY

variation from the Alpine type, and was called by our ancestors the Wood strawberry. The chief difference between the two is in the form of the fruit, the Wood varieties being round and the Alpine conical. They are also subdivided into white and red, annual and monthly varieties, and those that produce no runners, which are known to-day as Bush Alpines.

The Alpine, as we find it growing wild, was the strawberry of the ancients. It is to it that the suggestive lines of Virgil refer:—

> "Ye boys that gather flowers and strawberries,
> Lo, hid within the grass an adder lies."

There is no proof, I believe, that the strawberry was cultivated during any of the earlier civilizations. Some who wrote most explicitly concerning the fruit culture of their

time do not mention it; and Virgil, Ovid, and Pliny name it but casually, and with no reference to its cultivation. It may appear a little strange that the luxurious Romans, who fed on nightingales' tongues, peacocks' brains, and scoured earth and air for delicacies, should have given but little attention to this fruit. Possibly they early learned the fact that this species is essentially a wildling, and like the trailing arbutus, thrives best in its natural haunts. The best that grew could be gathered from mountain-slopes and in the crevices of rocks. Moreover, those old revellers became too wicked and sensual to relish Alpine strawberries.

Its congener, the Wood strawberry, was the burden of one of the London street cries four hundred years ago; and to-day the same cry, in some language or other, echoes around the northern hemisphere as one of the inevitable and welcome sounds of spring and early summer.

But few, perhaps, associate this lovely little fruit, that is almost as delicate and shy as the anemone, with tragedy; and yet its chief poetical associations are among the darkest and saddest that can be imagined. Shakespeare's mention of the strawberry in the play of Richard III. was an unconscious but remarkable illustration of the second line already quoted from Virgil:—

"Lo, hid within the grass an adder lies."

The bit of history which is the occasion of this allusion is given in the quaint old English of Sir Thomas More, who thus describes the entrance to the Council of the terrible "Protector," from whom nothing good or sacred could be protected. He came "fyrste about IX of the clocke, saluting them curtesly, and excusing himself that he had been from them so long, saieing merily that he had been a slepe that day. And after a little talking with them he said unto the bishop of Elye, my lord, You have very good strawberries at your gardayne in Holberne, I require you let us have a messe of them." He who has raised fine fruit will know how eagerly the flattered bishop obeyed. According

to the poet, the dissembler also leaves the apartment, with his unscrupulous ally, Buckingham.

"Where is my lord protector? I have sent
For these strawberries,"

said the Bishop of Ely, re-entering.

Lord Hastings looks around with an air of general congratulation, and remarks:—

"His grace looks cheerfully and smooth this morning;
There's some conceit or other likes him well."

The serpent is hidden, but very near. A moment later, Gloster enters, black as night, hisses his monstrous charge, and before noon of that same day poor Hastings is a headless corpse.

Far more sad and pitiful are the scenes recalled by the words of the fiendish Iago,—type for all time of those who transmute love into jealousy:—

"Tell me but this—
Have you not sometimes seen a handkerchief,
Spotted with strawberries, in your wife's hand?"
"I gave her such a one; 'twas my first gift."

was the answer of a man whom the world will never forgive, in spite of his immeasurable remorse.

From the poet Spenser we learn that to go a-strawberrying was one of the earliest pastimes of the English people. In the "Faerie Queen" we find these lines:—

"One day, as they all three together went
To the green wood to gather strawberries,
There chaunst to them a dangerous accident."

Very old, too is the following nursery rhyme, which, nevertheless, suggests the true habitat of the F. vesca species:—

"The man of the wilderness asked me
How many strawberries grew in the sea;
I answered him, as I thought good,
'As many red herrings as grew in the wood.'"

The ambrosial combination of strawberries and cream was first named by Sir Philip Sidney. Old Thomas Tusser,

of the 16th century, in his work, "Five Hundred Points of Good Husbandry united to as many of Good Housewifery," turns the strawberry question over to his wife, and doubtless it was in better hands than his, if his methods of culture were as rude as his poetry:—

> "Wife, into the garden, and set me a plot
> With strawberry roots, of the best to be got;
> Such, growing abroad, among thorns in the wood,
> Well chosen and pickèd prove excellent good."

Who "Dr. Boteler" was, or what he did, is unknown, but he made a sententious remark which led Izaak Walton to give him immortality in his work, "The Compleat Angler." "Indeed, my good schollar," the serene Izaak writes, "we may say of angling as Dr. Boteler said of strawberries, 'Doubtless God could have made a better berry, but doubtless God never did;' and so if I might be judge, God never did make a more calm, quiet, innocent recreation than angling." If this was true of the wild Wood strawberry, how much more so of many of our aromatic rubies of to-day.

John Parkinson, the apothecary-gardener of London, whose quaint work was published in 1629, is not so enthusiastic. He says of the wild strawberry: "It may be eaten or chewed in the mouth without any manner of offense; it is no great bearer, but those it doth beare are set at the toppes of the stalks, close together, pleasant to behold, and fit for a gentlewoman to wear on her arme, &c., as a raritie instead of a flower."

In England, the strawberry leaf is part of the insignia of high rank, since it appears in the coronets of a duke, marquis, and earl. "He aspires to the strawberry leaves" is a well-known phrase abroad, and the idea occurs several times in the novels of Disraeli, the present British Premier. Thackeray, in his "Book of Snobs," writes: "The strawberry leaves on her chariot panels are engraved on her ladyship's heart."

After all, perhaps it is not strange that the Alpine species

should be allied to some dark memories, for it was the only kind known when the age was darkened by passion and crime.

The one other allusion to the strawberry in Shakespeare is peculiarly appropriate to the species under consideration. In the play of Henry V., an earlier Bishop of Ely says:—

> "The strawberry grows underneath the nettle,
> And wholesome berries thrive and ripen best
> Neighbored by fruit of baser quality."

And this, probably, is still true, for the Alpine and Wood strawberries tend to reproduce themselves with such unvarying exactness that cultivation makes but little difference.

All these allusions apply to the F. vesca or Alpine species, and little advance was made in strawberry culture in Europe until after the introduction of other species more capable of variation and improvement. Still, attempts were made from time to time. As the Alpine differed somewhat from the Wood strawberry, they were brought to England about 200 years later than the tragedy of Lord Hastings' death, which has been referred to.

In connection with the White and Red Wood and Alpine strawberries, we find in 1623 the name of the "Hautbois" or Haarbeer strawberry, the Fragaria elatior of the botanists. This second species, a native of Germany, resembles the Alpine in some respects, but is a larger and stockier plant. Like the Fragaria vesca, its fruit-stalks are erect and longer than the leaves, but the latter are larger than the foliage of the Alpine, and are covered with short hairs, both on the upper and under surface, which give them a rough appearance. As far as I can learn, this species still further resembles the Alpines in possessing little capability of improvement and variation. Even at this late day the various named kinds are said to differ from each other but slightly. There is a very marked contrast, however, between the fruit of the Hautbois and Alpine species, for the former has a peculiar musky flavor which has never found much favor in

this country. It is, therefore, a comparatively rare fruit in our gardens, nor do we find much said of it in the past.

There is scarcely any record of progress until after the introduction of the two great American species. It is true that in 1660 a fruit grower at Montreuil, France, is "said to have produced a new variety from the seed of the Wood strawberry," which was called the "Cappron," and afterward the "Fressant." It was named as a distinct variety one hundred years later, but it may be doubted whether it differed greatly from its parent. Be this as it may, it is said to be the first improved variety of which there is any record.

Early in the 17th century, intercourse with this continent led to the introduction of the most valuable species in existence, the "Virginian" strawberry (Fragaria Virginiana), which grows wild from the Arctic regions to Florida, and westward to the Rocky Mountains. It is first named in the catalogue of Jean Robin, botanist to Louis XIII., in 1624. During the first century of its career in England, it was not appreciated, but as its wonderful capacity for variation and improvement—in which it formed so marked a contrast to the Wood strawberry—was discovered, it began to receive the attention it deserved. English gardeners learned the fact, of which we are making so much to-day, that by simply sowing its seeds, new and possibly better varieties could be produced. From that time and forward, the tendency has increased to originate, name and send out innumerable seedlings, the majority of which soon pass into oblivion, while a few survive and become popular, usually in proportion to their merit.

The Fragaria Virginiana, therefore, the common wild strawberry that is found in all parts of North America east of the Rocky Mountains, is the parent of nine-tenths of the varieties grown in our gardens; and its improved descendants furnish nearly all of the strawberries of our markets. As we have seen, the Fragaria vesca, or the Alpine species of Europe, is substantially the same to-day as it was a thou-

sand years ago. But the capacity of the Virginian strawberry for change and improvement is shown by those great landmarks in the American culture of this fruit,—the production of Hovey's Seedling by C. M. Hovey, of Cambridge, Mass., forty-five years since; of the Wilson's Albany Seedling, originated by John Wilson, of Albany, N. Y., about twenty-five years ago, and, in our own time, of the superb varieties, Monarch of the West, Seth Boyden, Charles Downing, and Sharpless.

As in the Alpine species there are two distinct strains,—the Alpine of the Continent, and the Wood strawberry of England,—so in the wild Virginian species there are two branches of the family,—the Eastern and the Western. The differences are so marked that some writers have asserted that there are two species; but we have the authority of Professor Gray for saying that the Western, or Fragaria Illinœnsis, is "perhaps" a distinct species, and he classifies it as only a very marked variety.

There are but two more species of the strawberry genus. Of the first of these, the Fragaria Indica, or "Indian" strawberry, there is little to say. It is a native of Northern India, and differs so much from the other species that it was formerly named as a distinct genus. It has yellow flowers, and is a showy house-plant, especially for window-baskets, but the fruit is dry and tasteless. It is said by Professor Gray to have escaped cultivation and become wild in some localities of this country.

Fragaria Chilensis is the last great species or subdivision that we now have to consider. Like the F. Virginiana, it is a native of the American continent, and yet we have learned to associate it almost wholly with Europe. It grows wild on the Pacific slope, from Oregon to Chili, creeping higher and higher up the mountains as its habitat approaches the equator. "It is a large, robust species, with very firm, thick leaflets, soft and silky on the under side." The flowers are larger than in the other species; the fruit, also, in its native condition, averages much larger, stands erect instead

of hanging, ripens late, is rose-colored, firm and sweet in flesh, and does not require as much heat to develop its saccharine constituents; but it lacks the peculiar sprightliness and aroma of the Virginia strawberry. It has become, however, the favorite stock of the European gardeners, and seems better adapted to transatlantic climate and soil than to ours. The first mention of the Fragaria Chilensis, or South American strawberry, says Mr. Fuller, "is by M. Frezier, who, in 1716, in his journey to the South Sea, found it at the foot of the Cordillera mountains near Quito, and carried it home to Marseilles, France." At that time it was called the Chili strawberry, and the Spaniards said that they brought it from Mexico.

From Mr. W. Collett Sandars, an English antiquarian, I learned that seven plants were shipped from Chili and were kept alive during the voyage by water which M. Frezier saved from his allowance, much limited owing to a shortness of supply. He gave two of the plants to M. de Jessieu, "who cultivated them with fair success in the royal gardens." In 1727, the Chili strawberry was introduced to England, but not being understood it did not win much favor.

Mr. Fuller further states: "We do not learn from any of the old French works that new varieties were raised from the Chili strawberry for at least fifty years after its introduction." Duchesne, in 1766, says that "Miller considered its cultivation abandoned in England on account of its sterility. The importations from other portions of South America appeared to have met with better success; and, early in the present century, new varieties of the F. Chilensis, as well as of the Virginiana, became quite abundant in England and on the Continent."

If we may judge from the characteristics of the varieties imported to this country of late years, the South American species has taken the lead decidedly abroad, and has become the parent stock from which foreign culturists, in the main, are seeking to develop the ideal strawberry. But in

all its transformations, and after all the attempts to infuse into it the sturdier life of the Virginian strawberry, it still remembers its birthplace, and falters and often dies in the severe cold of our winters, or, what is still worse, the heat and drought of our summers. As a species, it requires the high and careful culture that they are able and willing to give it in Europe. The majority of imported varieties have failed in the United States, but a few have become justly popular in regions where they can be grown. The Triomphe de Gand may be given as an example, and were I restricted to one variety I should take this. The Jucunda, also, is one of the most superb berries in existence; and can be grown with great profit in many localities.

Thus the two great species which to-day are furnishing ninety-nine hundredths of the strawberries of commerce and of the garden, both in this country and abroad, came from America, the Fragaria Chilensis reaching our Eastern States by the way of Europe, and in the form of the improved and cultivated varieties that have won a name abroad. We are crossing the importations with our own native stock. President Wilder's superb seedling, which has received his name, is an example of this blending process. This berry is a child of the La Constante and Hovey's Seedling, and, therefore, in this one beautiful and most delicious variety we have united the characteristics of the two chief strawberry species of the world, the F. Virginiana and F. Chilensis.

It will be seen that the great law of race extends even to strawberry plants. As in the most refined and cultivated peoples there is a strain of the old native stock, which ever remains, a source of weakness or strength, and will surely show itself in certain emergencies, so the superb new varieties of strawberries, the latest products of horticultural skill, speedily indicate in the rough-and-tumble of ordinary culture whether they have derived their life from the hardy F. Virginiana or the tender and fastidious F. Chilensis. The Monarch of the West and the Jucunda are the patricians of the garden, and on the heavy portions of my land at

Cornwall I can scarcely say to which I give the preference. But the Monarch is Anglo-Saxon and the Jucunda is of a Latin race; or to drop metaphor, the former comes of a species that can adapt itself to conditions extremely varied, and even very unfavorable, and the latter cannot.

CHAPTER V

IDEAL STRAWBERRIES VERSUS THOSE OF THE FIELD AND MARKET

THERE are certain strong, coarse-feeding vegetables, like corn and potatoes, that can be grown on the half-subdued and comparatively poor soil of the field; but no gardener would think of planting the finer and more delicate sorts in such situations. There are but few who do not know that they can raise cauliflowers and egg-plants only on deep, rich land. The parallel holds good with this fruit. There are strawberries that will grow almost anywhere, and under any circumstances, and there is another class that demands the best ground and culture. But from the soil of a good garden, with a little pains, we can obtain the finest fruit in existence; and there is no occasion to plant those kinds which are grown for market solely because they are productive, and hard enough to endure carriage for a long distance. The only transportation to be considered is from the garden to the table, and therefore we can make table qualities our chief concern. If our soil is light and sandy, we can raise successfully one class of choice, high-flavored varieties; if heavy, another class. Many worry over a forlorn, weedy bed of some inferior variety that scarcely gives a week's supply, when, with no more trouble than is required to obtain a crop of celery, large, delicious berries might be enjoyed daily, for six weeks together, from twenty different kinds.

The strawberry of commerce is a much more difficult problem. The present unsatisfactory condition of affairs

was admirably expressed in the following editorial in the "Evening Post" of June 12, 1876, from the pen of the late William Cullen Bryant:—

STRAWBERRIES

"In general, an improvement has been observed of late in the quality of fruit. We have more and finer varieties of apple; the pear is much better in general than it was ten years since; of the grape there are many new and excellent varieties which the market knew nothing of a few years ago, and there are some excellent varieties of the raspberry lately introduced. But the strawberry has decidedly deteriorated, and the result is owing to the general culture of Wilson's Albany for the market. Wilson's Albany is a sour, crude berry, which is not fully ripe when it is perfectly red, and even when perfectly ripe is still too acid. When it first makes its appearance in the market, it has an exceedingly harsh flavor and very little of the agreeable aroma which distinguishes the finer kinds of the berry. If not eaten very sparingly, it disagrees with the stomach, and you wake with a colic the next morning. Before Wilson's strawberry came into vogue there were many other kinds which were sweeter and of a more agreeable flavor. But the Wilson is a hard berry, which bears transportation well; it is exceedingly prolific and altogether hardy,—qualities which give it great favor with the cultivator, but for which the consumer suffers. The proper way of dealing in strawberries is to fix the prices according to the quality of the sort. This is the way they do in the markets of Paris. A poor sort, although the berry may be large, is sold cheap; the more delicate kinds—the sweet, juicy, and high-flavored—are disposed of at a higher price. Here the Wilson should be sold the cheapest of all, while such as the Jucunda and the President Wilder should bear a price corresponding to their excellence. We hope, for our part, that the Wilsons will, as soon as their place can be supplied by a better berry, be banished from the

market. It can surely be no difficult thing to obtain a sort by crossing, which shall bear transportation equally well, and shall not deceive the purchaser with the appearance of ripeness."

The reader will perceive that Mr. Bryant has portrayed both the evil and the remedy. The public justly complains of the strawberry of commerce, but it has not followed the suggestion in the editorial and demanded a better article, even though it must be furnished at a higher price.

In spite, however, of all that is said and written annually against the Wilson, it still maintains its supremacy as the market berry. Those who reside near the city and can make, to some extent, special arrangements with enlightened customers, find other varieties more profitable, even though the yield from them is less and some are lost from lack of keeping qualities. But those who send from a considerable distance, and must take their chances in the general market, persist in raising the "sour, crude berry," which is red before it is ripe, and hard enough to stand the rough usage which it is almost certain to receive from the hands through which it passes. I do not expect to see the day when the Wilson, or some berry like it, is not the staple supply of the market; although I hope and think it will be improved upon. But let it be understood generally that they are "Wilsons,"—the cheap vin ordinaire of strawberries. Cities will ever be flooded with varieties that anybody can grow under almost any kind of culture; and no doubt it is better that there should be an abundance of such fruit rather than none at all. But a delicately organized man, like Mr. Bryant, cannot eat them; and those who have enjoyed the genuine strawberries of the garden will not. The number of people, however, with the digestion of an ostrich, is enormous, and in multitudes of homes Wilsons, even when half-ripe, musty, and stale, are devoured with unalloyed delight, under the illusion that they are strawberries.

If genuine strawberries are wanted, the purchaser must

demand them, pay for them, and refuse "sour, crude berries." The remedy is solely in the hands of the consumers.

If people would pay no more for Seckel than for Choke pears, Choke pears would be the only ones in market, for they can be furnished with the least cost and trouble. It is the lack of discrimination that leaves our markets so bare of fine-flavored fruit. What the grower and the grocer are seeking is a hard berry, which, if not sold speedily, will "keep over." Let citizens clearly recognize the truth,—that there are superb, delicious berries, like the Triomphe, Monarch, Charles Downing, Boyden, and many others, and insist on being supplied with them, just as they insist on good butter and good meats, and the problem is solved. The demand will create the supply; the fruit merchant will write to his country correspondents: "You must send fine-flavored berries. My trade will not take any others, and I can return you more money for half the quantity of fruit if it is good." The most stolid of growers would soon take such a hint. Moreover, let the patrons of high-priced hotels and restaurants indignantly order away "sour, crude berries," as they would any other inferior viand, and caterers would then cease to palm off Wilsons for first-class strawberries. If these suggestions were carried out generally, the character of the New York strawberry market would speedily be changed. It is my impression that, within a few years, only those who are able to raise large, fine-flavored fruit will secure very profitable returns. Moreover, we are in a transition state in respect to varieties, and there are scores of new kinds just coming before the public, of which wonderful things are claimed. I shall test nearly a hundred of these during the coming season, but am satisfied in advance that nine-tenths of them will be discarded within a brief period. Indeed, I doubt whether the ideal strawberry, that shall concentrate every excellence within its one juicy sphere, ever will be discovered or originated. We shall always have to make a choice, as we do in friends, for their several good qualities and their power to please our individual tastes.

There is, however, one perfect strawberry in existence,—the strawberry of memory,—the little wildlings that we gathered perhaps, with those over whom the wild strawberry is now growing. We will admit no fault in it, and although we may no longer seek for this favorite fruit of our childhood, with the finest specimens of the garden before us we sigh for those berries that grew on some far-off hillside in years still farther away.

CHAPTER VI

CHOICE OF SOIL AND LOCATION

THE choice that Tobias Hobson imposed on his patrons when he compelled them to take "the horse nearest to the stable-door" or none at all, is one that, in principle, we often have to make in selecting our strawberry-ground. We must use such as we have, or raise no berries. And yet it has been said that "with no other fruit do soil and locality make so great differences." While I am inclined to think that this is truer of the raspberry, it is also thoroughly established that location and the native qualities of the soil are among the first and chief considerations in working out the problem of success with strawberries.

Especially should such forethought be given in selecting a soil suited to the varieties we wish to raise. D. Thurber, editor "American Agriculturist," states this truth emphatically. In August, 1875, he wrote: "All talk about strawberries must be with reference to particular soils. As an illustration of this, there were exhibited in our office windows several successive lots of the Monarch of the West, which were immense as to size and wonderful as to productiveness. This same Monarch behaved in so unkingly a manner on our grounds (very light and sandy in their nature) that he would have been deposed had we not seen these berries, for it was quite inferior to either Charles Downing, Seth Boyden, or Kentucky."

It is a generally admitted fact that the very best soil, and

the one adapted to the largest number of varieties, is a deep sandy loam, moist, but not wet in its natural state. All the kinds with which I am acquainted will do well on such land if it is properly deepened and enriched. Therefore, we should select such ground if we have it on our places, and those proposing to buy land with a view to this industry would do well to secure from the start one of the best conditions of success.

It is of vital importance that our strawberry fields be near good shipping facilities, and that there be sufficient population in the immediate vicinity to furnish pickers in abundance. It will be far better to pay a much higher price for land—even inferior land—near a village and a railroad depot, than to attempt to grow these perishable fruits in regions too remote. A water communication with market is, of course, preferable to any other. Having considered the question of harvesting and shipping to market, then obtain the moist, loamy land described above, if possible.

Such ground will make just as generous and satisfactory returns in the home garden, and by developing its best capabilities the amateur can attain results that will delight his heart and amaze his neighbors.

Shall the fact that we have no such soil, and cannot obtain it, discourage us? Not at all! There are choice varieties that will grow in the extremes of sand or clay. More effort will be required, but skill and information can still secure success; and advantages of location, climate, and nearness to good markets may more than counterbalance natural deficiencies in the land. Besides, there is almost as solid a satisfaction in transforming a bit of the wilderness into a garden as in reforming and educating a crude or evil specimen of humanity. Therefore if one finds himself in an unfavorable climate, and shut up to the choice of land the reverse of a deep, moist, sandy loam, let him pit his brain and muscle against all obstacles.

If the question were asked, "Is there anything that comes from the garden better liked than a dish of strawberries?"

in nine instances out of ten the answer would be, "Nothing," even though sour Wilsons were grown; and yet, too often the bed is in a neglected corner and half shaded by trees, while strong-growing vegetables occupy the moist, open spaces. It is hardly rational to put the favorite of the garden where, at best, a partial failure is certain. Let it be well understood that strawberries cannot be made to do well on ground exhausted by the roots and covered by the shade of trees.

On many farms and even in some gardens there are several varieties of soil. Within the area of an acre I have a sandy loam, a gravelly hillside, low, black, alluvial land, and a very stiff, cold, wet clay. Such diversity does not often occur within so limited a space, but on multitudes of places corresponding differences exist. In such instances, conditions suited to every variety can be found, and reading and experience will teach the cultivator to locate his several kinds just where they will give the best results. Moreover, by placing early kinds on warm, sunny slopes, and giving late varieties moist, heavy land, and cool, northern exposures, the season of this delicious fruit can be prolonged greatly. The advantage of a long-continued supply for the family is obvious, but it is often even more important to those whose income is dependent on this industry. It frequently occurs that the market is "glutted" with berries for a brief time in the height of the season. If the crop matures in the main at such a time, the one chance of the year passes, leaving but a small margin of profit; whereas, if the grower had prolonged his season, by a careful selection of soils as well as of varieties, he might sell a large portion of his fruit when it was scarce and high.

Climate is also a very important consideration, and enters largely into the problem of success from Maine to Southern California. Each region has its advantages and disadvantages, and these should be estimated before the purchaser takes the final steps which commit him to a locality and methods of culture which may not prove to his taste. In

the far North, sheltered situations and light, warm land should be chosen for the main crop; but in our latitude, and southward, it should always be our aim to avoid that hardness and dryness of soil that cut short the crops and hopes of so many cultivators.

CHAPTER VII

PREPARING AND ENRICHING THE SOIL

HAVING from choice or necessity decided on the ground on which our future strawberries are to grow, the next step is to prepare the soil. The first and most natural question will be: What is the chief need of this plant? Many prepare their ground in a vague, indefinite way. Let us prepare for strawberries.

Whether it grows North or South, East or West, the strawberry plant is the same, and has certain constitutional traits and requirements, which should be thoroughly fixed in our minds. Modifications of treatment made necessary by various soils and climates are then not only easily learned but also easily understood.

When asked, on one occasion, what was the chief requirement in successful strawberry culture, Hon. Marshall P. Wilder replied substantially in the following piquant manner:—

"In the first place, the strawberry's chief need is a great deal of water.

"In the second place, it needs more water.

"In the third place, I think I would give it a great deal more water."

The more extended and full my experience becomes, the less exaggeration I find in his words. The following strong confirmation of President Wilder's opinion may be found in Thompson's "Gardener's Assistant," a standard English work:—

"Ground that is apt to get very dry from the effects of only ten days' or a fortnight's drought is not suitable, on account of the enormous quantity of water that will be necessary; and if once the plants begin to flag for want of moisture, the crop is all but lost. A soil that is naturally somewhat moist, but not too wet, answers well; and where the land has admitted of irrigation, we have seen heavy crops produced every year."

If this be true in England, with its humid climate, how much more emphatically should we state the importance of this requirement in our land of long droughts and scorching suns.

Moisture, then, is the strawberry's first and chief need. Without it, the best fertilizers become injurious rather than helpful. Therefore, in the preparation of the soil and its subsequent cultivation, there should be a constant effort to secure and maintain moisture, and the failure to do this is the chief cause of meagre crops. And yet, very probably, the first step absolutely necessary to accomplish this will be a thorough system of underdrainage. I have spent hundreds of dollars in such labors, and it was as truly my object to enable the ground to endure drought as to escape undue wetness. Let it be understood that it is *moist* and not *wet* land that the strawberry requires. If water stands or stagnates upon or a little below the surface, the soil becomes sour, heavy, lifeless; and if clay is present, it will bake like pottery in dry weather, and suggest the Slough of Despond in wet. Disappointment, failure, and miasma are the certain products of such unregenerate regions, but, as is often the case with repressed and troublesome people, the evil traits of such soil result from a lack of balance, and a perversion of what is good.

The underdrain restores the proper equilibrium; the brush-hook and axe cut away the rank unwholesome growth which thrives best in abnormal conditions. Sun, air, and purifying frosts mellow and sweeten the damp, heavy mala-

rious ground, as the plowshare lifts it out of its low estate. A swamp, or any approach to one, is like a New York tenement-house district, and requires analogous treatment.

If, however, we have mellow upland with natural drainage, let us first put that in order that we may have a remunerative crop as soon as possible. In suggesting, therefore, the best methods of preparing and enriching the ground, I will begin by considering soils that are already in the most favorable conditions, and that require the least labor and outlay. Man received his most essential agricultural instruction in the opening chapter of Genesis, wherein he is commanded to "subdue the earth." Even the mellow western prairie is at first a wild, untamed thing, that must be subdued. This is often a simple process, and in our gardens and the greater part of many farms has already been practically accomplished. Where the deep, moist loam, just described, exists, the fortunate owner has only to turn it up to the sun and give it a year of ordinary cultivation, taking from it, in the process, some profitable hoed crop that will effectually kill the grass, and his land is ready for strawberries. If his ground is in condition to give a good crop of corn, it will also give a fair crop of berries. If the garden is so far "subdued" as to yield kitchen vegetables, the strawberry may be planted at once, with the prospect of excellent returns, unless proper culture is neglected.

Should the reader be content with mediocrity, there is scarcely anything to be said where the conditions are so favorable. But suppose one is not content with mediocrity. Then this highly favored soil is but the vantage-ground from which skill enters on a course of thorough preparation and high culture. A man may plow, harrow, and set with strawberries the land that was planted the previous year in corn, and probably secure a remunerative return, with little more trouble or cost than was expended on the corn. Or, he may select half the area that was in corn, plow it deeply in October, and if he detects traces of the white grub, cross-plow it again just as the ground is beginning to freeze. Early in

the spring he can cover the surface with some fertilizer—there is nothing better than a rotted compost of muck and barn-yard manure—at the proportion of forty or fifty tons to the acre. Plow and cross-plow again, and in each instance let the first team be followed by a subsoil or lifting plow, which stirs and loosens the substratum without bringing it to the surface. The half of the field prepared in such a thorough manner will probably yield three times the amount of fruit that could be gathered from the whole area under ordinary treatment; and if the right varieties are grown, and a good market is within reach, the money received will be in a higher ratio.

The principle of generous and thorough preparation may be carried still further in the garden, and its soil, already rich and mellow, may be covered to the depth of several inches with well-rotted compost or any form of barn-yard manure that is not too coarse and full of heat, and this may be incorporated with the earth by trenching to the depth of two feet. Of this be certain, the strawberry roots will go as deeply as the soil is prepared and enriched for them, and the result in abundant and enormous fruit will be commensurate. English gardeners advise trenching even to the depth of three feet, where the ground permits it.

Few soils can be found so deep and rich by nature that they cannot be improved by art; and the question for each to decide is, how far the returns will compensate for extra preparation. Very often land for strawberries receives but little more preparation than for wheat, and such methods must pay or they would not be continued. Many who follow these methods declare that they are the most profitable in the long run. I doubt it.

If our market is one in which strawberries are sold simply as such, without much regard to flavor or size, there is not the same inducement to produce fine fruit. But even when quantity is the chief object, deeply prepared and enriched land retains that essential moisture of which we have spoken, and enables the plant not only to form, but also to develop

and mature, a great deal of fruit. In the majority of markets, however, each year, size and beauty count for more, and these qualities can be secured, even from a favorable soil, only after thorough preparation and enriching. I find that every writer of experience on this subject, both American and European, insists vigorously on the value of such careful pulverization and deepening of the soil.

Having thus considered the most favorable land in the best condition possible, under ordinary cultivation, I shall now treat of that less suitable, until we finally reach a soil too sterile and hopelessly bad to repay cultivation.

I will speak first of this same deep, moist loam, in its unsubdued condition; that is, in stiff sod, trees, or brush-wood. Of course, the latter must be removed, and, as a rule, the crops on new land—which has been undisturbed by the plow for a number of years and, perhaps, never robbed of its original fertility—will amply repay for the extra labor of clearing. Especially will this be the case if the brush and rubbish are burned evenly over the surface. The finest of wild strawberries are found where trees have been felled and the brush burned; and the successful fruit grower is the one who makes the best use of such hints from nature.

The field would look better and the cultivation be easier if all the stumps could be removed before planting, but this might involve too great preliminary expense, and I always counsel against debt except in the direst necessity. A little brush burned on each stump will effectually check new growth, and, in two or three years, these unsightly objects will be so rotten that they can be pried out, and easily turned into ashes, one of the best of fertilizers. In the meantime, the native strength of the land will cause a growth which will compensate for the partial lack of deep and thorough cultivation which the stumps and roots prevent. Those who have travelled West and South have seen fine crops of corn growing among the half-burned stumps, and strawberries will do as well.

But where trees or brush have grown very thickly, the

roots and stumps must be eradicated. The thick growth on the sandy land of Florida is grubbed out at the cost of about $30 per acre, and I know of a gentleman who pays at the rate of $25 per acre in the vicinity of Norfolk, Va. I doubt whether it can be done for less elsewhere.

In some regions they employ a stump extractor, a rude but strong machine, worked by blocks and pulleys, with oxen as motor power. From the "Farmer's Advocate" of London, Ont., I learn that an expert with one of these machines, aided by five men and two yoke of oxen, was in the habit of clearing fifty acres annually.

I have cleaned hedge-rows and stony spots on my place in the following thorough manner: A man commences with pick and shovel on one side of the land and turns it steadily and completely over by hand to the depth of fourteen to eighteen inches, throwing on the surface behind him all the roots, stumps and stones, and stopping occasionally to blast when the rocks are too large to be pried out. This, of course, is expensive, and cannot be largely indulged in; but, when accomplished, the work is done for all time, and I have obtained at once by this method some splendid soil, in which the plow sinks to the beam. A drought must be severe, indeed, that can injure such land.

There is a great difference in men in the performance of this work. I have one who, within a reasonable time, would trench a farm. Indeed, in his power to obey the primal command to "subdue the earth," my man, Abraham, is a hero—although, I imagine, he scarcely knows what the word means and would as soon think of himself as a hippopotamus. His fortunes would often seem as dark as himself to those who "take thought for the morrow;" and that is saying much, for Abraham is "colored" as far as man can be.

I doubt whether his foresight often reaches further than bedtime, and to that hour he comes with an honest right to rest. He is a family man, and has six or seven children, under eight years of age, whom he shelters in a wretched little house that appears tired of standing up. But to and

from this abode Abraham passes daily, with a face as serene as a May morning. In that weary old hovel I am satisfied that he and his swarming little brood have found what no architect can build—a home. Thither he carries his diurnal dollar, when he can get it, and on it they all manage to live and grow fat. He loses time occasionally, it is true, through illness, but no such trifling misfortune can induce him, seemingly, to take a long, anxious look into the future. Only once—it was last winter—have I seen him dismayed by the frowning fates. The doctor thought his wife would die, and they had nothing to eat in the house. When Abraham appeared before me at that time, "his countenance was fallen," as the quaint, strong language of Scripture expresses it. He made no complaints, however, and indulged in no Byronic allusions to destiny. Indeed, he said very little, but merely drooped and cowered, as if the wolf at the door and the shadow of death within it were rather more than he could face at one and the same time. It soon became evident, however, that his wife would "pull through," as he said, and then the wolf didn't trouble him a mite. He installed himself as cook, nurse, and house man-of-all-work, finding also abundant leisure to smoke his pipe with infinite content. One morning he was seen baking buckwheat cakes for the children; each one in turn received an allowance on a tin plate, and squatted here and there on the floor to devour it; and, from the master of ceremonies down, there was not an indication that all was not just as it should be. A few days later I met him coming back to his work with his pipe in the corner of his mouth, and the old confident twinkle in his eye as he said, "Mornin', Bossie." Now, Abraham carries his peculiar characteristics into grubbing. If I should set him at a hundred-acre field full of stumps and stones, and tell him to clear it to the depth of two feet, he would begin without any apparent misgiving, and with no more thought for the magnitude of his task than he has for the tangled and stubborn mysteries of life in general, or the dubious question of "what shall be on

the morrow" in his own experience. He would see only the little strip that he proposed to clear up that day, and would go to work in a way all his own.

Although not talkative to other people, he is very social with himself, and, in the early days of our acquaintance, I was constantly misled into the belief that somebody was with him, and that he was a man of words rather than work. As soon, however, as I reached a point from which I could see him, there he would be, alone, bending to his task with the steady persistence that makes his labor so effective; but, at the same time, until he saw me he would continue discussing with equal vigor whatever subject might be uppermost in his mind. I suppose he scarcely ever takes out a stone or root without apostrophizing, adjuring, and berating it in tones and vernacular so queer that one might imagine he hoped to remove the refractory object by magic rather than by muscle. When the sun is setting, however, and Abraham has complacently advised himself, "Better quit, for de day's done gone, and de ole woman is arter me, afeared I've kivered myself up a-grubbin'," one thing is always evident—a great many stones and roots are "unkivered," and Abraham has earned anew his right to the title of champion grubber.

But, as most men handle the pick and shovel, the fruit grower must be chary in his attempts to subdue the earth with those old-time implements. It is too much like making war with the ancient Roman short sword in an age of rifled guns. I agree with that practical horticulturist, Peter Henderson, that there are no implements equal to the plow and subsoiler, and, in our broad and half-occupied country, we should be rather shy of land where these cannot be used.

The cultivator whose deep moist loam is covered by sod only, instead of rocks, brush, and trees, may feel like congratulating himself on the easy task before him; and, indeed, where the sod is light, strawberries, and especially the larger small fruits, are often planted on it at once with fair success. I do not recommend the practice; for, unless the

subsequent culture is very thorough and frequent, the grass roots will continue to grow and may become so intertwined with those of the strawberry that they cannot be separated. Corn is probably the best hoed crop to precede the strawberry. Potatoes too closely resemble this fruit in their demand for potash, and exhaust the soil of one of the most needed elements. A dressing of wood ashes, however, will make good the loss. Buckwheat is one of the most effective means of subduing and cleaning land, and two crops can be plowed under in a single summer. Last spring I had some very stiff marsh sod turned over and sown with buckwheat, which, in our hurry, was not plowed under until considerable of the seed ripened and fell. A second crop from this came up at once, and was plowed under when coming into blossom, as the first should have been. The straw, in its succulent state, decayed in a few days, and by autumn my rough marsh sod was light, rich, and mellow as a garden, ready for anything.

If it should happen that the land designed for strawberries was in clover, it would make an admirable fertilizer if turned under while still green, and I think its use for this purpose would pay better than cutting it for hay, even though there is no better. Indeed, were I about to put any sod land, that was not very stiff and unsubdued, into small fruits, I would wait till whatever herbage covered the ground was just coming into flower, and then turn it under. The earlier growth that precedes the formation of seed does not tax the soil much, but draws its substance largely from the atmosphere, and when returned to the earth while full of juices, is valuable. In our latitude this can usually be done by the middle of June, and if on this sod buckwheat is sown at once, it will hasten the decay, loosen and lighten the soil in its growth, and in a few weeks be ready itself to increase the fertility of the field by being plowed under. In regions where farmyard manure and other fertilizers are scarce and high, this plowing under of green crops is one of the most effective ways both of enriching and preparing the land;

and if the reader has no severer labors to perform than this, he may well congratulate himself.

But let him not be premature in his self-felicitation, for he may find in his sod ground, especially if it be old meadow land, an obstacle worse than stumps and stones—the Lachnosterna fusca.

This portentous name may well inspire dread, for the thing itself can realize one's worst fears. The deep, moist loam which we are considering is the favorite haunt of this hateful little monster, and he who does not find it lying in wait when turning up land that has been long in sod, may deem himself lucky. The reader need not draw a sigh of relief when I tell him that I mean merely the "white grub," the larva of the May-beetle or June-bug, that so disturbs our slumbers in early summer by its sonorous hum and aimless bumping against the wall. This white grub, which the farmers often call the "potato worm," is, in this region, the strawberry's most formidable foe, and, by devouring the roots, will often destroy acres of plants. If the plow turns up these ugly customers in large numbers, the only recourse is to cultivate the land with some other crop until they turn into beetles and fly away. This enemy will receive fuller attention in a later chapter.

It is said that this pest rarely lays its eggs in plowed land, preferring sod ground, where its larvae will be protected from the birds, and will find plenty of grass roots on which to feed. Nature sees to it that white grubs are taken care of, but our Monarch strawberries need our best skill and help in their unequal fight; and if "Lachnos" and tribe should turn out in force, Alexander himself would be vanquished.

CHAPTER VIII.

PREPARATION OF SOIL BY DRAINAGE

EXCESSIVE moisture will often prevent the immediate cultivation of our ideal strawberry land. Its absence is fatal, its excess equally so. Let me suggest some of the evil effects. Every one is aware that climate—that is the average temperature of the atmosphere throughout the year—has a most important influence on vegetation. But a great many, I imagine, do not realize that there is an underground climate also, and that it is scarcely less important that this should be adapted to the roots than that the air should be tempered to the foliage. Water-logged land is cold. The sun can bake, but not warm it to any extent. Careful English experiments have proved that well-drained land is from 10 to 20 degrees warmer than wet soils; and Mr. Parkes has shown, in his "Essay on the Philosophy of Drainage," that in "draining the 'Red Moss' the thermometer in the drained land rose in June to 66 degrees at seven inches below the surface, while in the neighboring water-logged land it would never rise above 47 degrees—an enormous gain."

In his prize essay on drainage, Dr. Madden confirms the above, and explains further, as follows: "An excess of water injures the soil by diminishing its temperature in summer and increasing it in winter—a transformation of nature most hurtful to perennials, because the vigor of a plant in spring depends greatly on the lowness of temperature to which it has been subjected during the winter (within certain limits, of course), as the difference of temperature between

winter and spring is the exciting cause of the ascent of the sap." In other words, too much water in the soil may cause no marked difference between the underground climate of winter and spring.

Dr. Madden shows, moreover, that excess of water keeps out the air essential not only in promoting chemical changes in the soil itself and required by the plants, but also the air which is directly needed by the roots. Sir H. Davy and others have proved that oxygen and carbonic acid are absorbed by the roots as well as by the foliage, and these gases can be brought to them by the air only.

Again, drainage alters the currents which occur in wet soil. In undrained land, evaporation is constantly bringing up to the roots the sour, exhausted water of the subsoil, which is an injury rather than a benefit. On the other hand, the rain just fallen passes freely through a drained soil, carrying directly to the roots fresh air and stimulating gases.

Wet land also produces conditions which disable the foliage of plants from absorbing carbonic acid, thus greatly decreasing its atmospheric supply of food. Other reasons might be given, but the reader who is not satisfied had better set out an acre of strawberries on water-logged land. His empty pocket will out-argue all the books.

The construction of drains may be essential, for three causes: 1st. Land that is dry enough naturally may lie so as to collect and hold surface water, which, accumulating with every rain and snow storm, at last renders the soil sour and unproductive. 2nd. Comparatively level land, and even steep hillsides, may be so full of springs as to render drains at short intervals necessary. 3rd. Streams, flowing perhaps from distant sources, may find their natural channel across our grounds. If these channels are obstructed or inadequate, we find our land falling into the ways of an old soaker.

It should here be stated, however, that if we could cause streams to overflow our land in a shallow, sluggish current, so that a sediment would be left on the surface after a

speedy subsidence, the result would be in miniature like the overflow of the Nile in Egypt, most beneficial, that is, if means for thorough subsequent drainage was provided.

If there is an abundance of stone on one's place suitable for the construction of drains, it can often be used to advantage, as I shall show; but for all ordinary purposes of drainage, round tile with collars are now recommended by the best authorities. It is said that they are cheaper than stone, even where the latter is right at hand; and the claim is reasonable, since, instead of the wide ditch required by stone, a narrow cut will suffice for tile; thus a great saving is at once effected in the cost of digging. Tile also can be laid rapidly, and are not liable to become obstructed if properly protected at points of discharge by gratings, so that vermin cannot enter. They should not be laid near willow, elm, and other trees of like character, or else the fibrous roots will penetrate and fill the channel. If one has a large problem of drainage to solve, he should carefully read a work like Geo. E. Waring's "Drainage for Profit and for Health;" and if the slope or fall of some fields is very slight, say scarcely one foot in a hundred, the services of an engineer should be employed and accurate grades obtained. By a well-planned system, the cost of draining a place can be greatly reduced, and the water made very useful.

On my place at Cornwall I found three acres of wet land, each in turn illustrating one of the causes which make drainage necessary. I used stone, because, in some instances, no other material would have answered, in others partly because I was a novice in the science of drainage, and partly because I had the stones on my place, and did not know what else to do with them. I certainly could not cart them on my neighbors' ground without having a surplus of hot as well as cold water, so I concluded to bury them in the old-fashioned box-drains. Indeed, I found rather peculiar and difficult problems of drainage, and the history of their solution may contain useful hints to the reader.

In front of my house there is a low, level plot of land,

containing about three acres. Upon this the surface water ran from all sides, and there was no outlet. The soil was, in consequence, sour, and in certain spots only a wiry marsh grass would grow. And yet it required but a glance to see that a drain, which could carry off this surface water immediately, would render it the best land on the place. I tried, in vain, the experiment of digging a deep, wide ditch across the entire tract, in hopes of finding a porous subsoil. Then I excavated great, deep holes, but came to a blue clay that held water like rubber. The porous subsoil, in which I knew the region abounded, and which makes Cornwall exceptionally free from all miasmatic troubles, eluded our spades like hidden treasures. I eventually found that I must obtain permission of a neighbor to carry a drain across another farm to the mountain stream that empties into the Hudson at Cornwall Landing. The covered drain through the adjoining place was deep and expensive, but the ditch across my land (marked A on the map) is a small one, walled with stone on either side. It answers my purpose, however,

MAP SHOWING EXPERIMENTS IN THE DRAINAGE OF A STRAWBERRY FARM

giving me as good strawberry land as I could wish. On both sides of this open ditch, and at right angles with it, I had the ground plowed into beds 130 feet long by 21 wide. The shallow depressions between these beds slope gently toward the ditch, and thus, after every storm, the surface water, which formerly often covered the entire area, is at once carried away. I think my simple, shallow, open drain is better than tile in this instance.

As may be seen from the map, my farm is peculiar in outline, and resembles an extended city lot, being 2,550 feet long, and only 410 wide.

The house, as shown by the engraving, stands on quite an elevation, in the rear of which the land descends into another swale or basin. The drainage of this presented a still more difficult problem. Not only did the surface water run into it, but in moist seasons the ground was full of springs. The serious feature of the case was that there seemed to be no available outlet in any direction. Unlike the mellow, sandy loam in front of the house, the swale in the rear was of the stiffest kind of clay—just the soil to retain and be spoiled by water. During the first year of our residence here this region was sometimes a pond, sometimes a quagmire, while again, under the summer sun, it baked into earthenware. It was a doubtful question whether this stubborn acre could be subdued, and yet its heavy clay gave me just the diversity of soil I needed. Throughout the high gravelly knoll on which the house stands, the natural drainage is perfect, and a sagacious neighbor suggested that if I cut a ditch across the clayey swale into the gravel of the knoll, the water would find a natural outlet and disappear.

The ditch was dug eight feet wide and five feet deep, for I decided to utilize the surface of the drain as a road-bed. Passing out of the clay and hard-pan, we came into the gravel, and it seemed porous enough to carry off a fair-sized stream. I concluded that my difficult problem had found a cheap and easy solution, and to make assurance doubly

sure, I directed the men to dig a deep pit and fill it with stones. When they had gone about nine feet below the surface, I happened to be standing on the brink of the excavation, watching the work. A laborer struck his pick into the gravel, when a stream gushed out which in its sudden abundance suggested that which flowed in the wilderness at the stroke of Moses's rod. The problem was now complicated anew. So far from finding an outlet, I had dug a well which the men could scarcely bail out fast enough to permit of its being stoned up.

My neighbors remarked that my wide ditch reminded them of the Erie canal, and my wife was in terror lest the children should be drowned in it. Now something had to be done, and I called in the services of Mr. Caldwell, city surveyor of Newburgh, and to his map I refer the reader for a clearer understanding of my tasks.

Between the upper and lower swales, the ridge on which the house stands slopes to its greatest depression along its western boundary, and I was shown that if I would cut deep enough, the open drain in the lower swale could receive and carry off the water from the upper basin. This appeared to be the only resource, but with my limited means it was like a ship-canal across the Isthmus of Panama. The old device of emptying my drains into a hole that practically had no bottom, suggested itself to me. It would be so much easier and cheaper that I resolved once more to try it, though with hopes naturally dampened by my last moist experience. I directed that the hole (marked B on the map) should be oblong, and in the direct line of the ditch, so that if it failed of its purpose it could become a part of the drain. Down we went into as perfect sand and gravel as I ever saw, and the deeper we dug the dryer it became. This time, in wounding old "Mother Earth," we did not cut a vein, and there seemed a fair prospect of our creating a new one, for into this receptacle I decided to turn my largest drain and all the water that the stubborn acre persisted in keeping.

I therefore had a "box-drain" constructed along the western boundary of the place (marked C) until it reached the lowest spot in the upper swale. This drain was simply and rapidly constructed, in the following manner: a ditch was first dug sufficiently deep and wide, and with a fall that carried off the water rapidly. In the bottom of this ditch the men built two roughly faced walls, one foot high and eight inches apart. Comparatively long, flat stones, that would reach from wall to wall, were easily found, and thus we had a covered water-course, eight by twelve inches, forming the common box-drain that will usually last a lifetime.

The openings over the channel were carefully "chinked" in with small stones and all covered with inverted sods, shavings, leaves, or anything that prevented the loose soil from sifting or washing down into the water-course.

At the upper end of the box-drain just described, a second and smaller receptacle was dug (marked D), and from this was constructed another box-drain (E), six inches square, across the low ground to the end of the canal in which we had found the well (F). This would not only drain a portion of the land but would also empty the big ditch (G), and prevent the water of the well from rising above a certain point. This kind of stone-work can be done rapidly; two men in two short winter days built thirteen rods with a water-course six inches in the clear.

To the upper and further end of the canal (G), I constructed another and cheaper style of drain. In the bottom of this ditch (H), two stones were placed on their ends or edges and leaned together so as to form a kind of arch, and then other stones were thrown over and around them until they reached a point eighteen inches from the surface. Over these stones, as over the box-drains also, was placed a covering of any coarse litter to keep the earth from washing down; and then the construction of one or two short side-drains, the refilling the ditches and levelling the ground completed my task.

It will be remembered that this entire system of drainage

ended in the excavation (B) already described. The question was now whether such a theory of drainage would "hold water." If it would, the hole I had dug must not, and I waited to see. It promised well. Quite a steady stream poured into it and disappeared. By and by there came a heavy March storm. When I went out in the morning, everything was afloat. The big canal and the well at its lower end were full to overflowing. The stubborn acre was a quagmire, and alas! the excavation which I had hoped would save so much trouble and expense was also full. I plodded back under my umbrella with a brow as lowering as the sky. There seemed nothing for it but to cut a "Dutch gap" that would make a like chasm in my bank account. By noon it cleared off, and I went down to take a melancholy survey of the huge amount of work that now seemed necessary, when, to my great joy, the oblong cut, in which so many hopes had seemingly been swamped, was entirely empty. From the box-drain a large stream poured into it and went down—to China, for all that I knew. I went in haste to the big canal and found it empty, and the well lowered to the mouth of the drain. The stubborn acre was now under my thumb, and I have kept it there ever since. During the past summer, I had upon its wettest and stiffest portion two beds of Jucunda strawberries that yielded at the rate of one hundred and ninety bushels to the acre. The Jucunda strawberry is especially adapted to heavy land requiring drainage, and I think an enterprising man in the vicinity of New York might so unite them as to make a fortune. The hole was filled with stones and now forms a part of my garden, and the canal answers for a road-bed as at first intended. In the fortuitous well I have placed a force-pump, around which are grown and watered my potted plants. The theory of carrying drains into gravel does hold water, and sometimes holes can be dug at a slight expense, that practically have no bottom. I have no doubt that in this instance tile would have been better and cheaper than the small stone drains that I have described.

In the rear of my place there was a third drainage problem very different from either of the other two. My farm runs back to the rise of the mountain, whose edge it skirts for some distance. It thus receives at times much surface water. At the foot of the mountain-slope, there are about three acres of low alluvial soil, that was formerly covered with a coarse, useless herbage of the swamp. Between the meadow and the slope of the mountain, "the town" built a "boulevard" (marked I I on the map), practically "cribbing" an acre or two of land. Ahab, who needed Naboth's vineyard for public purposes, is the spiritual father of all "town boards."

At the extreme end of the farm, and just beyond the alluvial ground, was the channel of a brook (marked J). Its stony bed, through which trickled a rill, had a very innocent aspect on the October day when we looked the farm over and decided upon its purchase. The rill ran a little way on my grounds, then crept under the fence and skirted my western boundary for several hundred yards. On reaching a rise of land, it re-entered my place and ran obliquely across it. It thus enclosed three sides of the low, bushy meadow I have named. Its lower channel across the place had been stoned up with the evident purpose of keeping it within limits; but the three or four feet of space between the walls had become obstructed by roots, bushes, vines and debris in general. With the exception of the stony bed where it entered the farm, most of its course was obscured by overhanging bushes and the sere, rank herbage of autumn.

In a vague way I felt that eventually something would have to be done to direct this little child of the mountain into proper ways, and to subdue the spirit of the wilderness that it diffused on every side. I had its lower channel across the place (K K) cleared out, thinking that this might answer for the present; and the gurgle of the little streamlet along the bottom of the ditch seemed a low laugh at the idea of its ever filling the three square feet of space above it. Deceitful little brook! Its innocent babble con-

tained no suggestion of its hoarse roar on a March day, the following spring, as it tore its way along, scooping the stones and gravel from its upper bed and scattering them far and wide over the alluvial meadow. Instead of a tiny rill, I found that I would have to cope at times with a mountain torrent. At first, the task was too heavy, and the fitful-tempered brook, and the swamp-like region it encompassed, were left for years to their old wild instincts. At last the increasing demands of my business made it necessary to have more arable land, and I saw that, if I could keep it from being overwhelmed with water and gravel, the alluvial meadow was just the place for strawberries.

I commenced at the lowest point where it finally leaves my grounds, and dug a canal (K K), twelve feet wide by four or five deep, across my place, stoning up its walls on either side. An immense amount of earth and gravel was thrown on the lower side so as to form a high, strong embankment in addition to the channel. Then, where it entered the farm above the meadow, I had a wide, deep ditch excavated, throwing all the debris between it and the land I wished to shield. Throughout the low meadow, two covered box-drains (L and M) were constructed so that the plow could pass over them. On the side of the meadow next to the boulevard and mountain, I had an open drain (N N) dug and filled with stones even with the ground. It was designed to catch and carry off the surface water, merely, from the long extent of mountain-slope that it skirted. The system of ditches to protect and drain the partial swamp, and also to manage the deceitful brook, was now finished, and I waited for the results. During much of the summer there was not a drop of water in the wide canal, save where a living spring trickled into it. The ordinary fall rains could scarcely more than cover the broad, pebbly bottom, and the unsophisticated laughed and said that I reminded them of a general who trained a forty-pound gun on a belligerent mouse. I remembered what I had seen, and bided my time.

But I did not have to wait till March. One November day it began to rain, and it kept on. All the following night there was a steady rush and roar of falling water. It was no ordinary pattering, but a gusty outpouring from the "windows of heaven." The two swales in the front and rear of the house became great muddy ponds, tawny as the "yellow Tiber," and through intervals of the storm came the sullen roar of the little brook that had been purring like a kitten all summer. Toward night, Nature grew breathless and exhausted; there were sobbing gusts of wind and sudden gushes of rain, that grew less and less frequent. It was evident she would become quiet in the night and quite serene after her long, tempestuous mood.

As the sun was setting I ventured out with much misgiving. The deepening roar as I went down the lane increased my fears, but I was fairly appalled by the wild torrent that cut off all approach to the bridge. The water had not only filled the wide canal, but also, at a point a little above the bridge, had broken over and washed away the high embankment. I skirted along the tide until I reached the part of the bank that still remained intact, and there beneath my feet rushed a flood that would have instantly swept away horse and rider. Indeed, quite a large tree had been torn up by its roots, and carried down until it caught in the bridge, which would also have gone had not the embankment above given way.

The lower part of the meadow was also under water. It had been plowed, and therefore would wash readily. Would any soil be left? A few moments of calm reflection, however, removed my fears. The treacherous brook had not beguiled me during the summer into inadequate provision for this unprecedented outbreak. I saw that my deep, wide cut had kept the flood wholly from the upper part of the meadow, which contained a very valuable bed of high-priced strawberry plants, and that the slowly moving tide which covered the lower part was little more than backwater and overflow. The wide ditches were carrying off

swiftly and harmlessly the great volume that, had not such channels been provided, would have made my rich alluvial meadow little else than a stony, gravelly waste. And the embankment had given way at a point too low down to permit much damage.

The two swales in the front and rear of the house appeared like mill-ponds. In the former instance, the water had backed up from the mountain stream into which my drain emptied, and, therefore, it could not pass off; and in the latter instance I could scarcely expect my little underground channel to dispose at once of the torrents that for forty hours had poured from the skies. I must give it at least a night in which to catch up. And a busy night it put in, for by morning it had conveyed to depths unknown the wide, discolored pond, that otherwise would have smothered the plants it covered. As soon, also, as the mountain stream fell below the mouth of the lower drain, it emptied at once the water resting on the lower swale. Throughout the day came successive tales of havoc and disaster, of dams scooped out, bridges swept away, roads washed into stony gulches, and fields and gardens overwhelmed with debris. The Idlewild brook, that the poet Willis made so famous, seemed almost demoniac in its power and fury. Not content with washing away dams, roads, and bridges, it swept a heavy wall across a field as if the stones were pebbles.

My three diverse systems of drainage had thus practically stood the severest test, perhaps, that will ever be put upon them, and my grounds had not been damaged to any extent worth naming. The cost had been considerable, but the injury caused by that one storm would have amounted to a larger sum had there been no other channels for the water than those provided by nature.

My readers will find, in many instances, that they have land which must be or may be drained. If it can be done sufficiently, the very ideal strawberry soil may be secured—moist and deep, but not wet.

CHAPTER IX

THE PREPARATION OF SOILS COMPARATIVELY UNFAVORABLE—CLAY, SAND, ETC.

WE have now reached a point at which we must consider land which in its essential character is unfavorable to strawberries, and yet which may be the best to be had. The difficulties here are not merely accidental or remediable, such as lack of depth or fertility, the presence of stones or stumps, undue wetness of soil, etc. Any or all of these obstacles may be found, but in addition there are evils inseparable from the soil, and which cannot be wholly eradicated. The best we can hope in such a case is to make up by art what is lacking in nature.

This divergence from the deep, moist sandy loam, the ideal strawberry land, is usually toward a stiff, cold, stubborn clay, or toward a droughty, leachy sand that retains neither fertility nor moisture. Of course, these opposite soils require in most respects different treatment.

We will consider first the less objectionable, that is, the heavy clay. To call clay more favorable for strawberries than sandy land may seem like heresy to many, for it is a popular impression that light soils are the best. Experience and observation have, however, convinced me of the contrary. With the clay you have a stable foundation. Your progress may be slow, but it can be made sure. The character of a sandy foundation was taught centuries ago. Moreover, all the fine foreign-blooded varieties, as well as our best native ones, grow far better on heavy land, and a soil largely mixed with clay gives a wider range in the choice of varieties.

If I had my choice between a farm of cold, stiff clay or light, leachy land, I would unhesitatingly take the former, and I would overcome its native unfitness by the following methods: If at all inclined to be wet, as would be natural from its tenacious texture, I should first underdrain it thoroughly with tile. Then, if I found a fair amount of vegetable matter, I would give it a dressing of air-slaked lime, and plow it deeply late in the fall, leaving it unharrowed so as to expose as much of the soil as possible to the action of frost. Early in the spring, as soon as the ground was dry enough to work and all danger of frost was over, I would harrow in buckwheat and plow it under as it came into blossom; then sow a second crop and plow that under also. It is the characteristic of buckwheat to lighten and clean land, and the reader perceives that it should be our constant aim to impart lightness and life to the heavy soil. Lime, in addition to its fertilizing effects, acts chemically on the ground, producing the desired effect. It may be objected that lime is not good for strawberries. That is true if crude lime is applied directly to the plants, as we would ashes or bone-dust; but when it is mixed with the soil for months, it is so neutralized as to be helpful, and in the meantime its action on the soil itself is of great value. It must be used for strawberries, however, in more limited quantities than for many other crops, or else more time must be given for it to become incorporated with the soil.

The coarse green straw of the buckwheat is useful by its mechanical division of the heavy land, while at the same time its decomposition fills the soil with ammonia and other gases vitally necessary to the plant. A clay soil retains these gases with little waste. It is thus capable of being enriched to almost any extent, and can be made a storehouse of wealth.

Where it can be procured, there is no better fertilizer for clay land than the product of the horse-stable, which, as a rule, can be plowed under in its raw, unfermented state, its heat and action in decay producing the best results. Of

course, judgment and moderation must be employed. The roots of a young, growing plant cannot feed in a mass of fermenting manure, no matter what the soil may be. The point I wish to make is that cold, heavy land is greatly benefited by having these heating, gas-producing processes take place beneath its surface. After they are over, the tall, rank foliage and enormous fruit of the Jucunda strawberry (a variety that can scarcely grow at all in sand) will show the capabilities of clay.

Heavy land is the favorite home of the grasses, and is usually covered with a thick, tenacious sod. This, of course, must be thoroughly subdued before strawberries are planted, or else you will have a hay-field in spite of all you can do. The decay of this mass of roots, however, furnishes just the food required, and a crop of buckwheat greatly hastens decomposition, and adds its own bulk and fertility when plowed under. I think it will scarcely ever pay to plant strawberries directly on the sod of heavy land.

While buckwheat is a good green crop to plow under, if the cultivator can wait for the more slowly maturing red-top clover, he will find it *far better*, both to enrich and to lighten up his heavy soil; for it is justly regarded as the best means of imparting the mellowness and friability in which the roots of strawberries as well as all other plants luxuriate.

There are, no doubt, soils fit for bricks and piping only, but in most instances, by a judicious use of the means suggested, they can be made to produce heavy and long-continued crops of the largest fruit.

These same principles apply to the small garden-plot as well as to the acre. Instead of carting off weeds, old pea-vines, etc., dig them under evenly over the entire space, when possible. Enrich with warm, light fertilizers, and if a good heavy coat of hot strawy manure is trenched in the heaviest, stickiest clay, in October or November, strawberries or anything else can be planted the following spring. The gardener, who thus expends a little thought and far-sighted labor will at last secure results that will surpass his

most sanguine hopes, and that, too, from land that would otherwise be as hard as Pharaoh's heart.

Before passing from this soil to that of an opposite character, let me add a few words of caution. Clay land should never be stirred when either very wet or very dry, or else a lumpy condition results that injures it for years. It should be plowed or dug only when it crumbles. When the soil is sticky, or turns up in great hard lumps, let it alone. The more haste the worst speed.

Again, the practice of fall plowing, so very beneficial in latitudes where frosts are severe and long continued, is just the reverse in the far South. There our snow is rain, and the upturned furrows are washed down into a smooth, sticky mass by the winter storms. On steep hillsides, much of the soil would ooze away with every rain, or slide downhill *en masse*. In the South, therefore, unless a clay soil is to be planted at once, it must not be disturbed in the fall, and it is well if it can be protected by stubble or litter, which shields it from the direct contact of the rain and from the sun's rays. But cow-peas, or any other rank-growing green crop adapted to the locality, is as useful to Southern clay as to Northern, and Southern fields might be enriched rapidly, since their long season permits of plowing under several growths.

Lime and potash in their various forms, in connection with green crops, would give permanent fertility to every heavy acre of Southern land. In my judgment, however, barnyard manure is not surpassed in value by any other in any latitude. If one owned clay land from which he could not secure good crops after the preparation that has been suggested, he had better either turn it into a brick-yard or emigrate.

Sandy Ground.—Suppose that, in contrast, our soil is a light sand. In this case the question of cultivation is greatly simplified, but the problem of obtaining a heavy crop is correspondingly difficult. The plow and the cultivator run readily enough, and much less labor is required to keep the

weeds in subjection, but as a rule, light land yields little fruit; and yet under favorable circumstances I have seen magnificent crops of certain varieties growing on sand. If sufficient moisture and fertility can be maintained, many of our best varieties will thrive and produce abundantly; but to do this is the very pith of our difficulty. Too often a sandy soil will not retain moisture and manure. Such light land is generally very deficient in vegetable matter; and therefore, whenever it is possible, I would turn under green crops. If the soil could be made sufficiently fertile to produce a heavy crop of clover, and this were plowed under in June, and then buckwheat harrowed in and its rank growth turned under in August, strawberries could be planted as soon as the heat of decay was over, with excellent prospects of fine crops for the three succeeding years. Did I propose to keep the land in strawberries, I would then give it another year of clover and buckwheat, adding bone-dust, potash, and a very little lime in some form. The green crop, when decayed, is lighter than clay, and renders its tenacious texture more friable and porous; it also benefits the sandy soil by supplying the absent humus, or vegetable mould, which is essential to all plant life. This mould is also cool and humid in its nature, and aids in retaining moisture.

With the exception of the constant effort to place green vegetable matter under the surface, my treatment of sandy ground would be the reverse of that described for clay. Before using the product of the horse-stable, I would compost it with at least an equal bulk of leaves, muck, sods, or even plain earth if nothing better could be found. A compost of stable manure with clay would be most excellent. If possible, I would not use any manure on light ground until all fermentation was over, and then I would rather *harrow* than plow it in. This will leave it near the surface, and the rains will leach it down to the roots—and below them, also—only too soon. Fertility cannot be stored up in sand as in clay, and it should be our aim to give our strawberries the food they need in a form that permits of

its immediate use. Therefore, in preparing such land, I would advise deep plowing while it is moist, if possible, soon after a rain; then the harrowing in of a liberal top-dressing of rotted compost, or of muck sweetened by the action of frost and the fermentation of manure, or, best of all, the product of the cow-stable. Decayed leaves, sods, and wood-ashes also make excellent fertilizers.

In the garden, light soils can be given a much more stable and productive character by covering them with clay to the depth of one or two inches every fall, and then plowing it in. The winter's frost and rains mix the two diverse soils, to their mutual benefit. Carting sand on clay is rarely remunerative; the reverse is decidedly so, and top-dressings of clay on light land are often more beneficial than equal amounts of manure.

As practically employed, I regard quick, stimulating manures, like aguno, very injurious to light soils. I believe them to be the curse of the South. They are used "to make a crop," as it is termed; and they do make it for a few years, but to the utter impoverishment of the land. The soil becomes as exhausted as a man would be should he seek to labor under the support of stimulants only. In both instances, an abundance of food is needed. A quinine pill is not a dinner, and a dusting of guano or phosphate cannot enrich the land.

And yet, by the aid of these stimulating commercial fertilizers, the poorest and thinnest soil can be made to produce fine strawberries, if sufficient moisture can be maintained. Just as a physician can rally an exhausted man to a condition in which he can take and be strengthened by food, so land, too poor and light to sprout a pea, can be stimulated into producing a meagre green crop of some kind, which, plowed under, will enable the land to produce a second and heavier burden. This, in turn, placed in the soil, will begin to give a suggestion of fertility. Thus, poor or exhausted soils can be made, by several years of skilful management, to convalesce slowly into strength.

Whether such patient outlay of time and labor will pay on a continent abounding in land naturally productive is a very dubious question.

Coarse, gravelly soils are usually even worse. If we must grow our strawberries on them, give the same general treatment that I have just suggested.

On some peat soils the strawberry thrives abundantly; on others it burns and dwindles. Under such conditions I should experiment with bone-dust, ashes, etc., until I found just what was lacking.

No written directions can take the place of common-sense, judgment, and, above all, experience. Soils vary like individual character. I have yet to learn of a system of rules that will teach us how to deal with every man we meet. It is ever wise, however, to deal justly and liberally. He that expects much from his land must give it much.

I have dwelt at length on the preparation and enrichment of the land, since it is the cornerstone of all subsequent success. Let me close by emphasizing again the principle which was made prominent at first. Though we give our strawberry plants everything else they need, our crop of fruit will yet be good or bad in the proportion that we are able to maintain abundant moisture during the blossoming and fruiting season. If provision can be made for irrigation, it may increase the yield tenfold.

CHAPTER X

COMMERCIAL AND SPECIAL FERTILIZERS

IN preparing and enriching the soil, and especially in subsequent cultivation, concentrated fertilizers are very useful and often essential. In dealing with this subject, however, I think we tread upon uncertain ground. There is a great deal of apparent accuracy of figures and analyses, carried carefully into decimals, but a wonderful deal of vagueness, uncertainty, and contradiction in the experiences and minds of cultivators.

It is well known that many commercial fertilizers are scandalously adulterated, and those who have suffered from frauds are hostile to the entire class. In their strong prejudice, they will neither discriminate nor investigate. There are others who associate everything having a chemical sound with "book farming," and therefore dismiss the whole subject with a sniff of contempt. This clique of horticulturists is rapidly diminishing, however, for the fruit grower who does not read is like the lawyer who tries to practice with barely a knowledge of the few laws revealed by a limited experience. In contrast, there are others who read and theorize too exclusively, and are inclined to assert that concentrated fertilizers supersede all others. They scout the muck swamp, the compost heap, and even the barnyard, as old-fashioned, cumbrous methods of bringing to the soil, in tons of useless matter, the essentials which they can deliver in a few sacks or barrels. On paper, they are scientific and accurate. The crop you wish to raise has constituents in certain proportions. Supply these, they say, and you have

the chemical compound, or crop. A field or garden, however, is not a sheet of blank paper, but a combination at which nature has been at work, and left full of obscurities. The results which the agricultural chemist predicted so confidently do not always follow, as they ought. Nature is often very indifferent to learned authorities.

There is yet another class—a large one, too—who regard these fertilizers as they do the drugs of an apothecary. They occasionally give their land a dose of them as they take medicine themselves, when indisposed or imagining themselves so. In either case there is almost entire ignorance of the nature of the compound or of definite reasons for its usefulness. Both the man and the field were "run down," and some one said that this, that, or the other thing was good. Therefore it was tried. Such haphazard action is certainly not the surest method of securing health or fertility.

In no other department of horticulture is there more room for common-sense, accurate knowledge, skill, and good management, than in the use of all kinds of fertilizers, and, in my judgment, close and continued observation is worth volumes of theory. The proper enrichment of the soil is the very cornerstone of success, and more fail at this point than at any other. While I do not believe that accurate and complete directions for the treatment of every soil can be written, it is undoubtedly true that certain correct principles can be laid down, and information, suggestion, and records of experience given which will be very useful. With such data to start with, the intelligent cultivator can work out the problem of success in the peculiar conditions of his own farm or garden.

It must be true that land designed for strawberries requires those constituents which are shown to compose the plant and fruit, and that the presence of each one in the soil should be in proportion to the demand for it. It is also equally plain that the supply of these essential elements should be kept up in continued cultivation. Therefore, the question naturally arises, what are strawberry plants

and fruit made of? Modern wine, we know, can be made without any grape juice whatever, but as Nature compounds strawberries in the open sunlight, instead of in back rooms and cellars, she insists on all the proper ingredients before she will form the required combination.

"The Country Gentleman" gives a very interesting letter from Prof. S. W. Johnson, of the Connecticut Experiment Station, containing the following careful analysis made by J. Isidore Pierre, a French writer. "Pierre," says the professor, "gives a statement of the composition, exclusive of water, of the total yield per hectare of fruit, taken up to June 30, and of leaves, stems and runners, taken up to the middle of August. These results, calculated in pounds per acre, are the following (the plants contained 62.3 per cent of water and fruit 90 per cent):

Composition of the water-free strawberry crop (except roots), at the middle of August, in pounds per acre, according to Pierre:

	Plants.	Fruits.	Totals.
Organic matter, exclusive of nitrogen	4268.4	1053.5	5321.9
Nitrogen	88.5	16.0	104.5
Silica, iron and manganese oxides	43.3	1.5 3.8	48.6
Phosphoric acid	35.3	5.4	40.7
Lime	102.7	7.9	110.6
Magnesia	16.1	.7	16.8
Potash	89.1	19.7	108.8
Soda	6.4	.9	7.3
Other matters	120.9	8·8	129.7
Dry substance	4770.7	1118.2	5888.9"

These are the constituents that, to start with, must be in the soil, and which must be kept there. This array of what to many are but obscure chemicals need not cause misgivings, since in most instances nature has stored them in the virgin soil in abundant proportions. Even in well-worn, long-cultivated fields, some of them may exist in sufficient quantity. Therefore, buying a special fertilizer is often like carrying coals to Newcastle. Useless expenditure may

be incurred, also, by supplying some, but not all, of the essential ingredients. A farmer applied six hundred pounds of superphosphate to a plat of corn-land, and three hundred pounds to an adjacent plat wherein the conditions were the same. The yield of the first plat was scarcely in excess of that of the second, and in neither case was there a sufficient increase to repay for the fertilizer. It does not follow that the man used an adulterated and worthless article. Analysis shows that corn needs nitrogen and potash in large proportions; and if these had been employed with the superphosphate, the result probably would have been very different. Superphosphate contains nitrogen, but not in sufficient degree. These considerations bring us to the sound conclusion that in enriching our land it would be wise to use complete fertilizers as far as possible; that is, manures containing all, or nearly all, the essential ingredients of the strawberry plant and fruit. If we could always know just what elements are lacking in our soils, we could merely supply these; but frequent analyses are expensive, and often misleading, at best. The safest plan is always to keep within reach of the plants the food we know they require, and the roots, with unerring instinct, will attend to the proportions. Hence the value of barnyard manure in the estimation of plain common-sense. A sensible writer has clearly shown that from twenty-three cows and five horses, if proper absorbents are used, $5.87 worth of nitrogen, potash, and phosphoric acid can be obtained every twenty-four hours, estimating these vitally important elements of plant-food at their wholesale valuation. In addition, there are the other constituents of the yard manure which, if not so valuable, are still very useful. To permit the waste of any fertilizer that can be saved or made upon our places, and then buy the same thing with the chance of being cheated, is thus shown to be wretched economy. Commercial fertilizers can never supersede the compost heap, into which should go everything which will enable us to place in the soil organic matter and the other elements that were given in the analysis;

and if all the sewage and waste of the dwelling and the products of the stable, stys and poultry-house were well composted with muck, sod, leaves, or even common earth, and used liberally, magnificent and continued crops of strawberries could be raised from nearly all soils.

In many instances, however, home-made composts are wholly inadequate to supply the need, and stable manures are too costly or not to be obtained. The fruit grower should then go to those manufacturers of fertilizers who have the best reputation, and who give the best guarantees against deception. There are perfectly honest dealers, and it is by far the cheapest in the end to pay them their price for a genuine article. If such concentrated agents are used in connection with a green crop like clover, land can be made and kept productive continuously. In the use of commercial fertilizers, there should be a constant and intelligent effort to keep up a supply of *all* the essential ingredients. Wood-ashes is a specific for strawberries. I have never found any one thing so good, and yet it is substantially but one thing, potash, and I should remember that the plant also requires nitrogen, which guano, or some form of animal manure, would furnish; lime, which is best applied to the strawberry in the form of bone meal,etc. The essential phosphoric acid is furnished in bone meal, the superphosphates, and also in wood-ashes. By referring to an analysis of the ash of red clover, it will be found to contain nearly everything that the strawberry requires.

The man who reads, observes, and experiments carefully, will find that he can accomplish much with lime and salt. If one has land full of vegetable or organic matter, an application of lime will render this matter fit for plant food, and the lime itself, in the course of a year or less, will be rendered harmless in the process. It also sweetens and lightens heavy, sour land, and thus, *in time* renders it better adapted to the strawberry; but lime should not be applied directly, in any considerable quantity, to strawberry plants, nor should it be used on very light soils defi-

cient in vegetable matter. The judicious use of salt in *small* quantities will, I think, prove very beneficial, especially on light upland. It tends to prevent injury from drought, and to clear the land of the larvæ of insects. I am inclined to think that much can be accomplished with this agent, and hope to make some careful experiments with it. But it should be used very cautiously, or it will check or destroy growth.

I have received a letter from Mr. J. H. Hale, of South Glastonbury, Conn., that is such a clear and interesting record of experience on this subject that I am led to give it almost entire:

"We have always used Peruvian guano, fish scrap, and ground bone to some extent, but until the past five years have depended mainly upon stable manure brought from New York city on boats, using about fifteen cords per acre yearly, and always with satisfactory results, the only objection being the expense. The price ranged from $8 to $12 per cord, or on an average of $150 per acre; and in trying to reduce this expense we commenced testing different fertilizers, planting, in 1874, one acre of strawberries manured with two tons of fish scrap, at $20 per ton, and one hundred bushels of unleached wood-ashes, at 30 cents per bushel; making a total cost of $70. The result was a strong, rapid growth of plants early in the summer, but in September and October they began to show signs of not having plant food enough, and then we saw our mistake in using fish in place of bone, or some other slow-acting fertilizer that the plants could not have taken up so greedily early in the summer, but would have had to feed on slowly all through the season. The fruit crop the following year, as might have been expected, was not a success, being only about half a crop. In 1875, we planted another acre, using one ton of ground bone and one hundred bushels of wood-ashes, at a total cost of $73; the result was a fine, even growth of plants all through the season, and a perfect

crop of fruit the following year, fully equal to that on adjoining acres that had been manured with stable manure at a cost of $150 per acre, to say nothing of the carting of such a great bulk of manure. In the spring of 1876, being so well pleased with the appearance of our one acre manured with bone and ashes, we planned to fertilize all of our fruits in the same way. Then the question arose, where were we to get the ashes? We could buy enough for an acre or two, but not enough for our whole farm. What were we to do? Potash we must have, as that is the leading element of plant food required by small fruits of all kinds. We found we must look to the German potash salts for what we wanted, and we therefore bought several tons of High Grade (80 per cent) muriate of potash at $40 per ton, using 1,000 pounds per acre, and one ton of bone at $35, making a total cost of only $55 per acre. The plants did not grow quite as well early in the season as those on the fields where ashes were used, but later in the season they made a very fine growth, and at fruiting time, in 1877, we harvested a full and abundant crop of strawberries and raspberries. Since that time we have used nothing but ground bone and muriate of potash to manure all of our berry fields with, and continue to get fully as satisfactory results as in former years, when we depended upon stable manure at more than double the cost per acre. Some parties who have been looking into the matter suggest that possibly our satisfactory results are owing not so much to the fertilizers as to the liberal supply of stable manure used in former years. Yet the past season we picked 143 bushels of Charles Downings per acre, from a field manured with bone and potash, so poor and worn-out that two years before it would only produce six bushels of rye per acre. That land had no stable manure on it, and if it was not the bone and potash that furnished food for the berries, we would like to know what it was. The one mistake we have made is, I think, in not using six or eight hundred pounds of fish scrap or guano, and only 1,500 pounds of bone. The

fish or guano, being such quick-acting fertilizers, would give the plants a much better start early in the season than would be the case if only the bone and potash were used. We shall try it the coming spring. In applying the potash great care should be taken to have it thoroughly incorporated with the soil, it being only about 55 per cent actual potash; the balance, being largely composed of salt, would, of course, kill the roots of young plants if brought directly in contact with them. In fields where we have used the potash, we have been troubled with white grubs only to a very limited extent, while portions of the same field where stable manure had been used were badly infested with them, and while I do not think salt will drive them all out of the soil, I do believe it will do so to some extent. Besides the fertilizers I have named, we have in the past six years experimented in a small way with many others. Among them Stockbridge's strawberry manure and Mapes' fruit and vine manures, but have never had as good returns for the money invested as from the bone and potash; and yet, while they have proved of such great value to us, I would not advise you or any one to give up stable manure for them if you can get it at the same cost per acre, but if you cannot, then I say try bone dust and potash in a small way, until you learn just what *your soil* wants, and then supply it, whether it be 500, 1,000, or 2,000 pounds per acre."

Mr. Hale adds:

"The most of our soil is a sandy loam. We have some heavy loam and a few acres of clay gravel, and we have always had good results from the use of bone and potash on all of these soils.

"We have never used lime on our berry fields at the time of planting, and yet, as you know, all of our New England soils are deficient in lime. We use some indirectly, as we grow clover to plow under, and usually give at that time a good dressing of lime. As we try to have a new

clover field every year, we get all around the farm in six or eight years, and we therefore get a dressing of lime all around once in that time, and have never been able to see any ill effects from it. In fact, we believe it a positive benefit in helping to keep down sorrel, if nothing more."

There would be very few worn-out farms, or poverty-stricken farmers, if all followed the example of the Hale brothers.

The value of potash and bone meal is thus clearly shown, but the latter does not contain nitrogen in sufficient quantity. I think Mr. Hale is correct in the opinion that he can secure better results by using at the same time some nitrogenous manure, like fish scrap, guano, etc. If he had heavy, cold, clay land to deal with, it is possible that he might find the stable manure the cheapest and best in the long run, even at its increased cost.

Mr. W. L. Ferris, of Poughkeepsie, writes to me that he has found great advantage in the use of the Mapes & Stockbridge special fertilizers. "My experience," he says, "is only as to strawberries, and on them I would say that the result of applying equal values of manure—stable and commercial—as to cost, would be from ten to twenty-five per cent in favor of the commercial, as a stimulant to apply in the spring, or, in small quantities, to plants first starting. This does not apply to the first preparation of the ground. In this direction I propose to experiment. I have heretofore applied fertilizers early in spring by hand, distributing it along the rows."

Records of varying experiences, and the discussion of commercial fertilizers, might be continued indefinitely, but enough has been said, I think, to suggest to each cultivator unacquainted with the subject in what directions he should seek success. If I were asked what is the one special manure in which the strawberry especially delights, I should answer unhesitatingly, the well decayed and composted production of the cow-stable, and if the reader had seen Mr.

Durand's beds of the Great American variety in bearing, after being enriched with this material, he would be well satisfied to use it when it could be obtained. The vines of even this fastidious berry, that falters and fails in most soils, averaged one foot in height, and were loaded with enormous fruit. The subject may be summed up by an extract from a letter of Mr. Alexander Hyde to the "New York Times":

"Nitrates, phosphates, and ammonia are good fertilizers, and just the chemicals which most lands need, but plants require a good bed as well as good food. The physical condition of the soil, as well as the chemical, must receive attention; and we know of nothing superior to a well-made compost for furnishing both the chemical and physical conditions necessary for the development of our crops. '

CHAPTER XI

OBTAINING PLANTS AND IMPROVING OUR STOCK

HAVING prepared and enriched our ground, we are ready for the plants. They can often be obtained from a good neighbor whose beds we have watched across the fence, and whose varieties we have sampled to our satisfaction. But the most liberal neighbors may not be able to furnish all we need, or the kinds we wish. Moreover, in private gardens, names and varieties are usually in a sad tangle. We must go to the nurseryman. At this point, perhaps, a brief appeal to the reader's common-sense may save much subsequent loss and disappointment.

In most of our purchases, we see the article before we take it, and can estimate its value. Just the reverse is usually true of plants. We know—or believe—that certain varieties are valuable, and we order them from a distance, paying in advance. When received, the most experienced cannot be sure that the plants are true to the names they bear. We must plant them in our carefully prepared land, expend upon them money, labor, and, above all, months and years of our brief lives, only to learn, perhaps, that the varieties are not what we ordered, and that we have wasted everything on a worthless kind. The importance of starting right, therefore, can scarcely be overestimated. It is always best to buy of men who, in the main, grow their own stock, and therefore know about it, and who have established a reputation for integrity and accuracy. The itinerant agent flits from Maine to California, and too often the marvellous portraits of fruits that he exhibits do not

even resemble the varieties whose names they bear. It is best to buy of those who have a "local habitation and a name," and then, if anything is wrong, one knows where to look for redress.

Even if one wishes to be accurate, it is difficult to know that one's stock is absolutely pure and true to name. The evil of mixed plants is more often perpetuated in the following innocent manner than by any intentional deception: For instance, one buys from a trustworthy source, as he supposes, a thousand "Monarch" strawberry plants, and sets them out in the spring. All blossoms should be picked off the first year, and, therefore, there can be no fruit as a test of purity that season. But by fall there are many thousands of young plants. The grower naturally says: "I bought these for the Monarch, therefore they are Monarchs," and he sells many plants as such. When coming into fruit the second summer, he finds, however, that not one in twenty is a Monarch plant. As an honest man, he now digs them under in disgust; but the mischief has already been done, and scattered throughout the country are thousands of mixed plants which multiply with the vigor of evil. Nurserymen should never take varieties for granted, no matter where obtained. I endeavor so to train my eye that I can detect the distinguishing marks even in the foliage and blossoms, and if anything looks suspicious I root it out. The foliage of the Monarch of the West is so distinct that if one learns to know it he can tell whether his plants are mixed at a glance.

If possible, the nurseryman should start with plants that he knows to be genuine, and propagate from them. Then, by constant and personal vigilance, he can maintain a stock that will not be productive chiefly of profanity when coming into fruit. This scrutiny of propagating beds is a department that I shall never delegate to any one else.

It is not thrift to save in the first cost of plants, if thereby the risk of obtaining poor, mixed varieties is increased. I do not care to save five dollars to-day and lose fifty by

the operation within a year. A gentleman wrote to me, "I have been outrageously cheated in buying plants." On the same page he asked me to furnish stock at rates as absurdly low as those of the man who cheated him. If one insists on having an article at far less than the cost of production, it is not strange that he finds some who will "cheat him outrageously." I find it by far the cheapest in the long run to go to the most trustworthy sources, and pay the grower a price which enables him to give me just what I want.

When plants are both fine and genuine they can still be spoiled, or, at least, injured in transit from the ground where they grew. Dig so as to save all the roots, shake these clean of earth, straighten them out, and tie the plants into bundles of fifty. Pack in boxes, with the roots down in moss and the tops exposed to the air. Do not press them in too tightly or make them too wet, or else the plants become heated—a process which speedily robs them of all vitality. In cool seasons, and when the distance is not too great, plants can be shipped in barrels thickly perforated with holes. The tops should be toward the sides and the roots in the centre, down through which there should be a circulation of air. In every case, envelop the roots in damp moss or leaves—damp, but not wet. Plants can be sent by mail at the rate of one cent per ounce, and those obtained in this way rarely fail in doing well.

This fact should be carefully kept in mind by those residing long distances from express offices, or the points from which they wish to order their plants. Packages weighing four pounds and less can be sent by mail and received with our letters, and by a little inquiry and calculation it may be found the cheapest and most convenient way of obtaining them. I find no difficulty in mailing all the small fruit plants to every part of the continent.

The greater part of the counting and packing of plants should be done in a cellar, or some place of low, even temperature, in order to prevent the little fibrous roots, on

which the future growth so greatly depends, from becoming shrivelled. The best part of the roots are extremely sensitive to sunlight or frost, and, worse than all, to a cold, dry wind. Therefore, have the plants gathered up as fast as they are dug and carried to a damp, cool room, where the temperature varies but little. From such a place they can be packed and shipped with the leisure that insures careful work.

After having obtained good, genuine plants to start with, we can greatly improve our stock by a system of careful selection. This is a truth of great importance, but so obvious that we need not dwell long upon it. Let me illustrate what I mean by the course I propose to enter upon during the coming season. In our beds of each variety there will be a few plants that, for some reason, will surpass all the others in vigor, productiveness, and especially in the manifestation of the peculiar and distinguishing traits of the variety. I shall carefully mark such plants, remove all others from their vicinity, and propagate from them. Thus, in the course of two or three years, I shall renew my entire stock of standard varieties from the very best and most characteristic specimens of each kind. From this improved stock the best types should be chosen again and again; and by this course I am satisfied that a surprising degree of excellence can be attained. It is on the same principle of careful breeding from blooded and perfect animals. From very many localities come the complaint that Wilsons and other fine old varieties are "running out." How can it be otherwise, in view of the treatment they receive and the careless way in which they are propagated? Even when unmixed, they are usually the enfeebled children of degenerate parents. There is no variety in the country more badly mixed than the Wilson; and the trouble often arises from wild strawberries creeping in among them from the edges of the field. The spurious plants are taken up with the others, and the mixture is scattered up and down the land. The same is true with other varieties that have long been in cul-

tivation. Indeed, I have found mixtures in new varieties obtained directly from the originators. Therefore the need that the plant grower should give personal and unceasing vigilance to the stock from which he propagates, and that those who take a pride in improving their stock should often scan their beds narrowly. Moreover, if a bed stands several years in the same place, new seedlings may spring up, and thus create a mixture.

CHAPTER XII

WHEN SHALL WE PLANT?

NATURE has endowed the strawberry-plant with the power of taking root and growing readily at almost any season when young plants can be obtained. My best success, however, has been in November and early spring. The latter part of May and the month of June is the only time at which I have not planted with satisfactory results. In Northern latitudes, early spring is preferable, for at this season the ground is moist, showers are abundant, and the impulse of growth is strong. The weather is cool, also, and therefore the plants rarely heat or dry out during transportation.

In the South, autumn is by far the best time to plant. When the young plants are grown on the same place, they may be transferred to the fruiting beds and fields any time between July and the middle of November. The earlier they are set out, if they can be kept growing during the remainder of the hot season, the larger will be the yield the following spring. As a rule, plants, unless grown in pots, can not be shipped from the North or South until cold weather. The forwarding to the latitude of Richmond begins in September, and to points further south in October and November; from Florida to Louisiana I hear of almost unvarying success.

Of late years the practice of growing plants in pots and sending them out as the florists do flowers has become very prevalent. These potted plants can be set out in July, August and September, and the ball of earth clinging to

their roots prevents wilting, and, unless they are neglected, insures their living. Pot-grown plants are readily obtained by sinking two and a half or three inch pots up to their rims in the propagating-beds, and filling them with rich earth mingled with old, thoroughly rotted compost, leaf mould, decayed sods, etc., but never with fresh, unfermented manure. I have found the admixture of a little fine bone meal with the soil to be strong aid to vigorous growth. The young runners are then so guided and held down by a small stone or lump of earth that they will take root in the pots. Indeed, quite large plants, if still attached to thrifty runners, may be taken up, their roots shortened to one-quarter of an inch, and these inserted in the little pots, which will be speedily filled with a new growth of roots. It is very important that abundant and continuous moisture should be maintained. A hot wind or a scorching sun will dry out within a few hours the small amount of earth the pots contain, and the plants thus receive a check from which they may never recover. The amateur should watch them closely, and the plant grower should employ a man with the clear understanding that he would lose his position if he permitted moisture to fail even for half a day.

In about two weeks, with good management, the plants will fill the pots with roots, which so interlace as to hold the ball of earth compactly together during transportation. This ball of earth with the roots, separates readily from the pot, and the plant, thus sustained, could be shipped around the world if kept from drying out and the foliage protected from the effects of alternate heat and cold. The agricultural editor of the "New York Weekly Times" writes me that the potted plants are worth their increased cost, if for no other reason, because they are so easily planted in hot weather.

The chief advantage of summer planting lies in the fact that we obtain a good crop the following season, while plants set out in spring should not be permitted to bear at all the same year. If we discover in May or June that our

supply is insufficient, or that some new varieties offer us paradisiacal flavors, we can set out the plants in the summer or autumn of the same year, and within eight or ten months gather the fruits of our labors. If the season is somewhat showery, or if one is willing to take the trouble to water and shade the young plants, ordinary layers—that is, plants that have grown naturally in the open ground—will answer almost as well as those that have been rooted in pots. The fact that they do not cost half as much is also in their favor.

The disposition to plant in summer or autumn is steadily increasing, and the following reasons are good and substantial ones for the practice. In our gardens and fields there are many crops that mature in July, August, and September. The cultivation of these crops has probably left the ground mellow, and in good condition for strawberries. Instead of leaving this land idle, or a place for weeds to grow and seed, it can be deeply forked or plowed, and enriched, as has been explained. Even in July, potted plants may be bought, and unless the ground is full of the larvæ of the June beetle, or the plants are treated with utter neglect, not one in a hundred will fail. Say the plants cost us two and a half cents each by the time they are planted, instead of one half to one cent as in the spring, is there not a prospect of an equal or larger profit? A potted plant set out in summer or early autumn, and allowed to make no runners, will yield at least a pint of fruit; and usually these first berries are very large and fine, bringing the best prices. Suppose, however, we are able to obtain but ten cents a quart, you still have a margin of two and one-half cents on each plant. Adding two cents to the cost of each plant to cover the expense of cultivation, winter protection, spring mulching, picking, etc., there still remains a profit of half a cent on each plant. Supposing we have an acre containing 14,520 plants, our estimate gives a profit of $72.60 for the first year. If we clear but a quarter of a cent on each plant, we have a profit of $36.30. The prospects are, how-

over, that if we plant early in the summer, on rich ground, and give good cultivation, our plants will yield more than a pint each, and the fruit sell for more than ten cents a quart.

This estimate applies to the common market varieties raised with only ordinary skill and success. Suppose, in contrast, one plants the large, showy, high-flavored varieties, and is able to obtain from fifteen to thirty cents per quart. The expenses in this case are no greater, while the profits are very largely increased.

Good potted plants can be bought for about $2.50 per 100, or $20 per 2,000. I do not think that they can be properly grown and sold at much lower rates and afford a living profit. Freight and express charges are a heavy item of expense, since the earth encasing the roots renders

A Potted Plant

the packages very heavy, and but comparatively few plants can be shipped in one box. But, allowing for all expenses, I think it is evident that people can obtain a fair profit from potted plants within eight or ten months from the time of planting. Moreover, autumn-set plants start with double vigor in early spring, and make a fine growth before the hot, dry weather checks them; and the crop from them the second year will be the very best that they are capable of producing. Two paying crops are thus obtained within two years, and the cost of cultivation the first year is slight, for the plants are set after the great impulse of annual weed growth is past. With spring-set plants you get but one crop in two years. The first year yields nothing unless plants are sold, and yet the cultivation must be unceasing through

May, June and July, when Nature seems to give no little thought to the problem of how many weeds can be grown to the square inch. If one wishes early plants, he certainly should practice autumn planting, for a plant set even in November will begin to make runners nearly a month earlier than one set in spring.

Thus far we have looked at the subject from a business standpoint.

Those who wish plants for the home supply certainly should not hesitate to furnish their gardens as early in the summer as possible. To wait two years of our short lives for *strawberries* because the plants are a little cheaper in the spring is a phase of economy that suggests the moon. Such self-denial in a good cause would be heroic.

If people will use a little forethought, they can practice summer and autumn planting with double success, independently of the plant grower. We have shown that there is no mystery in raising potted plants. Moreover, in the hottest summers there are showery, cloudy days when ordinary layer plants can be set with perfect safety. If the field or garden bed is near where the layer plants are growing, the latter can be taken up with earth clinging to their roots, and thus have all the advantages of potted plants. Even under the Southern sun, hundreds of acres are, in this manner, set annually in the vicinity of Charleston.

As the autumn grows cool and moist, layer plants can be obtained from a distance and set out profitably in large quantities. The chief danger in late planting results from the tendency of the plants to be thrown out of the ground by the action of the frost, and a few varieties do not seem sufficiently hardy to endure severe cold. I obviate this difficulty by simply hoeing upon the plants two inches of earth, just before the ground freezes in November or December. This winter covering of soil enables me to plant with entire success at any time in the fall—even late in November—instead of spring, when there is a rush of work.

The earth is raked off the plants in March or April, as soon as severe freezing weather is over; otherwise they would decay. Do not first put manure on the plants and then cover with earth—cover with earth only.

Thus it will be seen that each period has its advantages, which will vary with different seasons. If drought and heat come in early May, spring-set plants may suffer badly. Again, periods in summer and autumn may be so hot and dry that even potted plants can only be kept alive by repeated waterings. My practice is to divide my plantings about equally between summer, fall, and spring. I thus take no chances of failure.

CHAPTER XIII

WHAT SHALL WE PLANT?—VARIETIES, THEIR CHARACTER AND ADAPTATION TO SOILS

I HAVE in my library an admirable little treatise written by the late R. G. Pardee, and printed twenty-five years ago. While the greater part of what he says, relating to the requirements of the plant and its culture, is substantially correct, his somewhat extended list of varieties is almost wholly obsolete. With the exception of Hovey's Seedling, scarcely one can be found in a modern catalogue. Even carefully prepared lists, made at a much later date, contain the names of but few kinds now seen in the garden or market. I have before me the catalogue of Prince & Co., published in 1865, and out of their list of 169 varieties but three are now in general cultivation, and the great majority are utterly unknown. Thus it would seem that a catalogue soon becomes historical, and that the kinds most heralded to-day may exist only in name but a few years hence. The reasons can readily be given. The convex heart of every strawberry blossom will be found to consist of pistils, and usually of stamens ranged around them. When both stamens and pistils are found in the same blossom, as is the case with most varieties, it is called a perfect flower, or staminate. In rare instances, strawberry flowers are found which possess stamens without pistils, and these are called male blossoms; far more often varieties exist producing pistils only, and they are named pistillate kinds. Either of the last two if left alone would be barren; the male flowers are always so, but the pistillate or female flowers, if fertilized with pollen from perfect-flowered plants, produce fruit. This fertilizing is effected by the agency of the wind, or by insects seeking honey.

The ovule in the ovarium to which the stigma leads represents, at maturity, a seed—the actual fruit of the strawberry—and within each seed Nature, by a subtile process of her own, wraps up some of the qualities of the plant that produced the seed, and some of the qualities also of the plant from which came the pollen that impregnated the ovule. This seed, planted, produces an entirely new variety, which, as a rule, exhibits characteristics of both its parents, and traits, also, of its grandparents and remote ancestors. The law of heredity is the same as in cattle or the human race. Thus it may be seen that millions of new varieties can be very easily obtained. A single plant-grower often raises many thousands to which he never gives a name, by reason of the fact—noted elsewhere than in the fruit garden—that most of these new strawberries in no respect surpass or even equal their parents. The great majority, after fruiting—which they do when two years old—are thrown away. A new variety which is not so good as the old ones from which it came should not be imposed upon the public. But they often are, sometimes deliberately, but far more often for other reasons; as, for instance, through the enthusiasm of the possessor. It is *his* seedling; therefore it is wonderful. He pets it and gives it extra care, to which even very inferior varieties generously respond.

In the same old catalogue to which I have referred Prince & Co announce: "We now offer a few of our superior new seedlings, with descriptions, and there is not an acid or inferior one among them. There is not one of them that is not superior to all the seedlings recently introduced." Not one of these thirty-five "superior seedlings," to my knowledge, is now in cultivation. They have disappeared in less than fifteen years; and yet I have no doubt that on the grounds of Prince & Co. they gave remarkable promise.

Again, a fruit grower sends out second and third-rate kinds from defective knowledge. He has not judiciously compared his petted seedlings with the superb varieties already in existence. It is soon discovered by general trial

that the vaunted new-comers are not so good as the old; and so they also cease to be cultivated, leaving only a name.

The editor of the "Rural New Yorker" has adopted a course which would be very useful indeed to the public, if it could be carried out in the various fruit-growing centres of the country. He obtains a few plants of every new variety offered for sale, and tests them side by side, under precisely the same conditions, reporting the results in his paper. Such records of experience are worth any amount of theory, or the half-truths of those who are acquainted with but few varieties. I tested fifty kinds last year in one specimen-bed. The plants were treated precisely alike, and permitted to mature all their fruit, I being well content to let eight or ten bushels go to waste in order to see just what each variety could do. From such trial-beds the comparative merits of each kind can be seen at a glance. Highly praised new-comers, which are said to supersede everything, must show what they are and can do beside the old standard varieties that won their laurels years ago. I thus learn that but few can endure the test, and occasionally I find an old kind sent out with a new name. When visiting fruit farms in New Jersey last summer, I was urged to visit a small place on which was growing a wonderful new berry. The moment I saw the fruit and foliage, I recognized the Col. Cheney, forced into unusual luxuriance by very favorable conditions. Other experienced growers, whose attention I called to the distinguishing marks of this variety, agreed with me at once; but the proprietor, who probably had never seen the Cheney before and did not know where the plants came from, thought it was a remarkable new variety, and as such it might have been honestly sent out. Trial-beds at once detect the old kinds with new names, and thus may save the public from a vast deal of imposition.

Such beds would also be of very great service in suggesting the varieties that can be grown with profit in certain localities. While the behavior of different kinds differs greatly

in varying soils and latitudes, there is no such arbitrary mystery in the matter as many imagine. I am satisfied that the sorts which did best in my trial-bed give the best promise of success wherever the soil and climate are similar. In contrast, let a trial-bed be made on a light soil in Delaware or Virginia, and 100 varieties be planted. Many that are justly favorites in our locality would there shrivel and burn, proving valueless; but those that did thrive and produce well, exhibiting a power to endure a Southern sun, and to flourish in sand, should be the choice for all that region. To the far South and North, and in the extremes of the East and West, trial-beds would give still varying results; but such results would apply to the soils and climate of the region if proper culture were given. A horse can be mismanaged on a Kentucky stock-farm, and there are those who would have ill luck with strawberries in the Garden of Eden—they are so skilful and persist in doing the wrong thing. It would well remunerate large planters to maintain trial-beds of all the small fruits, and their neighbors could afford to pay well for the privilege of visiting them and learning the kinds adapted to their locality.

I think it may be laid down as a general truth, that those kinds which do well on a light soil in one locality tend to do well on such soils in all localities. The same principle applies to those requiring heavy land. There will be exceptions, and but few of those containing foreign blood will thrive in the far South.

In the brief limits of this chapter I shall merely offer suggestions and the results of some experience, premising that I give but one man's opinion, and that all have a right to differ from me. At the close of this volume may be found more accurate descriptions of the varieties that I have thought worth naming.

Among the innumerable candidates for favor, here and there one will establish itself by persistent well-doing as a standard sort. We then learn that some of these strawberry

princes, like the Jucunda, Triomphe de Gand, and President Wilder, flourish only in certain soils and latitudes, while others, like the Charles Downing, Monarch of the West, and Wilson, adapt themselves to almost every condition and locality. Varieties of this class are superseded very slowly; but it would seem, with the exception of Wilson's Albany, that the standards of one generation have not been the favorites of the next. The demand of our age is for large fruit. The demand has created a supply, and the old standard varieties have given way to a new class, of which the Monarch and Seth Boyden are types. The latest of these new mammoth berries is the Sharpless, originated by Mr. J. K. Sharpless, of Catawissa, Pa.; which shows the progress made since horticulturists began to develop the wild *F. Virginiana* by crossing varieties and by cultivation.

The most accurate and extended list of varieties with which I am acquainted is to be found in Downing's "Encyclopedia of Fruits and Fruit Trees of America." It contains the names, with their synonymes, and the descriptions of over 250 kinds, and to this I refer the reader.

The important question to most minds is not how many varieties exist, but what kinds will give the best returns. If one possesses the deep, rich, moist loam that has been described, almost any good variety will yield a fair return, and the best can be made to give surprising results. For table use and general cultivation, North and South, East and West, I would recommend the Charles Downing, Monarch of the West, Seth Boyden, Kentucky Seedling, Duchess, and Golden Defiance. These varieties are all first-rate in quality, and they have shown a wonderful adaptation to varied soils and climates. They have been before the public a number of years, and have persistently proved their excellence. Therefore, they are worthy of a place in every garden. With these valuable varieties for our chief supply, we can try a score of other desirable kinds, retaining such as prove to be adapted to our taste and soil.

If our land is heavy, we can add to the above, in North-

ern latitudes, Triomphe de Gand, Jucunda, President Wilder, Forest Rose, President Lincoln, Sharpless, Pioneer, and Springdale.

If the soil is light, containing a large proportion of sand and gravel, the Charles Downing, Kentucky Seedling, Monarch of the West, Duchess, Cumberland Triumph, Miner's Prolific, Golden Defiance, and Sharpless will be almost certain to yield a fine supply of large and delicious berries, both North and South.

Let me here observe that varieties that do well on light soils also thrive equally well and often better on heavy land. But the converse is not true. The Jucunda, for instance, can scarcely be made to exist on light land. In the South, it should be the constant aim to find varieties whose foliage can endure the hot sun. I think that the Sharpless, which is now producing a great sensation as well as mammoth berries, will do well in most Southern localities. It maintained throughout the entire summer the greenest and most vigorous foliage I ever saw. Miner's Prolific, Golden Defiance, Early Hudson, and Cumberland Triumph also appear to me peculiarly adapted to Southern cultivation.

As we go north, the difficulties of choice are not so great. Coolness and moisture agree with the strawberry plant. There the question of hardiness is to be first considered. In regions, however, where the snow falls early and covers the ground all winter, the strawberry is not so exposed as with us, for our gardens are often bare in zero weather. Usually, it is not the temperature of the air that injures a dormant strawberry plant, but alternations of freezing and thawing. The deep and unmelting snows often enable the horticulturist to raise successfully in Canada tender fruits that would "winter-kill" much further south. If abundant protection is therefore provided, either by nature or by art, the people of the North can take their choice from among the best. In the high latitudes, early kinds will be in request, since the season of growth is brief. The best early berries are Duchess, Bidwell, Pioneer, Early

Hudson, Black Defiance, Duncan, Durand's Beauty, and, earliest of all, Crystal City. The last-named ripened first on my place in the summer of 1879, and although the fruit is of medium size, and rather soft, I fear, the plant is so vigorous and easily grown that I think it is worth general trial North and South. I am informed that it promises to take the lead in Missouri.

MARKET STRAWBERRIES

Thus far I have named those kinds whose fine flavor and beauty entitle them to a place in the home garden. But with a large class, market qualities are more worthy of consideration; and this phase of the question introduces us to some exceedingly popular varieties not yet mentioned. The four great requirements of a market strawberry are productiveness, size, a good, bright color, and—that it may endure long carriage and rough handling—firmness. Because of the indifference of the consumer, as explained in an earlier chapter, that which should be the chief consideration—flavor—is scarcely taken into account. In the present unenlightened condition of the public, one of the oldest strawberries on the list—Wilson's Seedling—is more largely planted than all other kinds together. It is so enormously productive, it succeeds so well throughout the entire country, and is such an early berry, that, with the addition of its fine carrying qualities, it promises to be the great market berry for the next generation also. But this variety is not at all adapted to thin, poor land, and is very impatient of drought. In such conditions, the berries dwindle rapidly in size, and even dry up on the vines. Where abundant fertility and moisture can be maintained, the yield of a field of Wilsons is simply marvellous. On a dry hillside close by, the crop from the same variety may not pay for picking. Plantations of Wilsons should be renewed every two years, since the plant speedily exhausts itself, producing smaller berries with each successive season. The Wilson is

perhaps the best berry for preserving, since it is hard and its acid is rich and not watery.

A rival of the Wilson has appeared within the last few years—the Crescent Seedling, also an early berry, originated by Mr. Parmelee, of New Haven, Conn. At first, it received unbounded prasie; now, it gets too much censure. It is a very distinct and remarkable variety, and, like the Wilson, I think, will fill an important place in strawberry culture. Its average size does not much exceed that of the Wilson; its flavor, when fully ripe, is about equal in the estimation of those who do not like acid fruit. In productiveness, on many soils, it will far exceed any variety with which I am acquainted. It is just this capacity for growing on thin, poor soils—anywhere and under any circumstances —that gives to it its chief value. In hardiness and vitality it is almost equal to the Canada thistle. The young plants are small, and the foliage is slender and delicate; but they have the power to live and multiply beyond that of any other variety I have seen. It thrives under the suns of Georgia and Florida, and cares naught for the cold of Canada; it practically extends the domain of the strawberry over the continent, and renders the laziest man in the land, who has no strawberries, without excuse. One of my beds yielded at the rate of 346 bushels to the acre, and the bright, handsome scarlet of the berries caused them to sell for as much in the open market as varieties of far better flavor. It is too soft for long carriage by rail. Those to whom flavor and large size are the chief considerations will not plant it, but those who have a near and not very fastidious market, that simply demands quantity and fine appearance, will grow it both largely and profitably. The stamens of the Crescent are so imperfectly developed that every tenth row in the field should be Wilsons, or some other early and perfect-flowered variety.

In the Champion, we have a late market berry that is steadily growing in favor. On rich, moist land it is almost as productive as the Crescent. The fruit averages much

larger than the Wilson, while its rich crimson color makes it very attractive in the baskets. The berries, like the two kinds already named, turn red before they are ripe, and in this immature condition their flavor is very poor, but when fully ripe they are excellent. The transformation is almost as great as in a persimmon. Under generous culture, the Champion yields superb berries, that bring the best prices. It also does better than most kinds under neglect and drought. It is too soft for long carriage, and its blossoms are pistillate.

Within a few years, a new variety named Windsor Chief has been disseminated, and the enormous yield of 17,000 quarts per acre has been claimed for it. It is said to be a seedling of the Champion fertilized with the Charles Downing variety. If there has been no mistake in this history of its origin, it is a remarkable instance of the reproduction of the traits of one parent only, for in no respect have I been able thus far to see wherein it differs from the Champion.

The Captain Jack is another late variety, which is enormously productive of medium-sized berries. It is a great favorite in Missouri and some other regions. The berries carry well to market, but their flavor is second-rate.

The good size, firmness, and lateness of the Glendale—a variety recently introduced—will probably secure for it a future as a market berry.

In the South, Neunan's Prolific, or the "Charleston Berry," as it is usually called, is already the chief variety for shipping. It is an aromatic berry, and very attractive as it appears in our markets in March and April, but it is even harder and sourer than an unripe Wilson. When fully matured on the vine it is grateful to those who like an acid berry. Scarcely any other kind is planted around Charleston and Savannah.

These six varieties, or others like them, will supply the first great need of all large markets—quantity. With the exception of the last, which is not productive in the North,

and requires good treatment even in the South, they yield largely under rough field culture. The fruit can be sold very cheaply and yet give a fair profit. Only a limited number of fancy berries can be sold at fancy prices, but thousands of bushels can be disposed of at eight and ten cents per quart.

Still, I would advise any one who is supplying the market, thoroughly to prepare and enrich an acre or more of moist but well drained land, and plant some of the large, showy berries, like the Sharpless, Monarch, and Seth Boyden. If he has heavy, rich soil, let him also try the Jucunda, President Lincoln, and, especially, the Triomphe de Gand. These varieties always have a ready sale, even when the market is glutted with common fruit, and they often command very high prices. When the soil suits them, they frequently yield crops that are not so far below the Wilson in quantity. Fifty bushels of large, handsome berries may bring as much, or more, than one hundred bushels of small fruit, while the labor and expense of shipping and picking are reduced one-half.

I suppose that Mr. E. W. Durand, of Irvington, N. J., obtains more money from one acre of his highly cultivated strawberries than do many growers from ten acres. Mr. H. Jerolaman, of Hilton, N. J., has given me some accurate statistics that well illustrate my meaning. "My yield," he writes, in 1877, "from one acre, planted chiefly with the Seth Boyden, was 327 bushels 15½ quarts, which were sold for $1,386.21. A strict account was kept. Since that time I have been experimenting with Mr. Durand's large berries, and have not done so well. In 1878, I obtained $1,181 from one acre, one-half planted with the Seth Boyden and the other with the Great American. The year of 1879 was my poorest. Nearly all my plants were Great American and Beauty, and the yield was 121 bushels, selling for $728. The average cost per acre, for growing, picking, marketing, and manure, is $350. I am not satisfied but that I shall have to return to the old Seth Boyden in order to keep

taking the first State premiums, as I have done for the past three years."

This record of experience shows what can be done with the choice varieties if an appreciative market is within reach, and one will give the high culture they demand. Last summer a neighbor of mine obtained eighteen cents per quart for his Monarch strawberries, when Wilsons brought but ten cents. At the same time, these superb varieties often do not pay at all under poor field culture and in matted rows. We may also note, in passing, how slowly fine old standard kinds, like the Boyden, are superseded by new varieties.

I should not be at all surprised if the Charles Downing became one of the most popular market strawberries of the future. It is already taking the lead in many localities. It is moderately firm—sufficiently so, with a little extra care, to reach most markets in good condition. It is more easily raised than the Wilson, and on thin, dry land is more productive. A bed will last, if kept clean, four or five years instead of two, and yield better the fifth year than the first. Although the fruit is but of medium size, it is so fine in flavor that it has only to be known to create a steady demand. The Kentucky Seedling is another berry of the same class, and has the same general characteristics—with this exception, that it is a very late berry. In flavor, it is melting and delicious. It does well on almost any soil, even a light and sandy one, and is usually very productive.

The best white strawberry I have ever seen is Lennig's White. When exposed to the sun, it has a decided pink flush on one side. It is beautiful and delicious, and so aromatic that a single berry will perfume a large apartment. The fruit is exceedingly delicate, but the plant is a shy bearer.

In the White and Red Alpines, especially the ever-bearing varieties, and in the Hautbois class, we have very distinct strawberries that are well worthy of a place in the garden. From a commercial point of view, they have no

value. This may settle the question with some, but not a few of us like to plant many things that are never to go to market.

In conclusion, if I were asked what is the most beautiful and delicious strawberry in existence, I should name the President Wilder. Perfect in flavor, form and beauty, it seems to unite in one exquisite compound the best qualities of the two great strawberry species of the world, the *F. Virginiana* and the *F. Chilensis*. The only fault that I have ever discovered is that, in many localities, it is not productive. No more do diamonds lie around like cobblestones. It is, however, fairly productive under good culture and on most soils, and yet it is possible that not one in a hundred of the habitués of Delmonico's has ever tasted it.

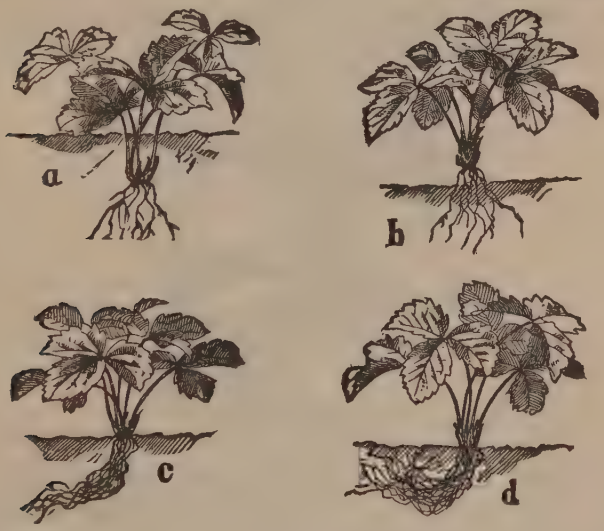
CHAPTER XIV

SETTING OUT PLANTS

WE may secure good plants of the best varieties, but if we do not set them out properly the chances are against our success, unless the weather is very favorable. So much depends on a right start in life, even in a strawberry bed. There are no abstruse difficulties in properly imbedding a plant. One would think that if a workman gave five minutes' thought and observation to the subject, he would know exactly how to do it. If one used his head as well as his hands, it would be perfectly obvious that a plant held (as in Figure *e*) with its roots spread out so that the fresh, moist earth could come in contact with each fibre, would stand a far better chance than one set out by any of the other methods illustrated. And yet, in spite of all I can do or say, I have never been able to prevent very many of my plants from being set (as in Figure *a*) too deeply, so that the crown and tender leaves were covered and smothered with earth; or (as in Figure *b*) not deeply enough, thus leaving the roots exposed. Many others bury the roots in a long, tangled bunch, as in Figure *c*. If one would observe how a plant starts on its new career, he would see that the roots we put in the ground are little more than a base of operations. All along their length, and at their ends, little white rootlets start, if the conditions are favorable, almost immediately. If the roots are huddled together, so that only a few outside ones are in contact with the life-giving soil, the conditions are of course most unfavorable. Again, many planters are guilty of the

folly illustrated in Figure *d*. They hastily scoop out a shallow hole, in which the roots, which should be down in the cool depths of the soil, curve like a half-circle toward or to the very surface.

In the most favorable weather of early spring a plant is almost certain to grow, no matter how greatly abused; but even then it does far better if treated properly, while at other seasons nature cannot be stupidly ignored. It is almost as easy to set out a plant correctly as otherwise.



WRONG METHODS OF PLANTING

Let the excavation be made deep enough to put the roots, spread out like a fan, down their whole length into the soil. Hold the plant with the left hand, as in Figure *e*. First, half fill the hole with fine rich earth with the right hand, and press it firmly against the roots; next, fill it evenly, and then, with the thumb and finger of both hands, put your whole weight on the soil on each side of the plant—as close to it as possible—and press until the crown or point from which the leaves start is just even with the surface.

If you can pull the plant up again by its leaves, it is not firm enough in the ground. If a man uses brain and eye, he can learn to work very rapidly. By one dexterous movement he scoops the excavation with a trowel. By a second movement, he makes the earth firm against the lower half of the roots. By a third movement, he fills the excavation and settles the plant into its final position. One workman will often plant twice as many as another, and not work any harder. Negro women at Norfolk, Virginia, paid at fifty cents per day, will often set two or three thousand. Many Northern laborers, who ask more than twice that sum, will not set half as many plants. I have been told

THE PROPER METHOD

of one man, however, who could set 1,000 per hour. I should examine his work carefully, however, in the fear that it was not well done.

If the ground is so flat that water lies upon it in wet seasons, then throw it up into beds with a plow, thus giving the plants a broad, level surface on which to grow; for I think the best success will generally be obtained with level culture, or as near an approach to it as possible.

Always make it a point to plant in moist, freshly stirred earth. Never let the roots come in contact with dry, lumpy soil. Never plant when the ground is wet and sticky, unless it be at the beginning of a rainstorm which bids fair to continue for some time. If sun or wind strikes land which

has been recently stirred while it is too wet, the hardness of mortar results.

In spring it is best to shorten in the roots one-third. This promotes a rapid growth of new rootlets, and therefore of the plants. In the summer and fall the young plants are not so well furnished with roots, and usually it is best to leave them uncut.

It often happens that during long transportation the roots become sour, black, and even a little mouldy. In

ROOT PRUNING

this case, wash them in clean water from which the chill has been taken. Trim carefully, taking off the blackened, shrivelled ends. Sprinkle a couple of tablespoonfuls of fine bone meal immediately about the plant after setting, and then water it. If the weather is warm, soak the ground and keep it moist until there is rain. Never let a plant falter or go back from lack of moisture.

How often should one water? Often enough to keep the ground *moist all the time*, night and day. There is nothing mechanical in taking care of a young plant any more than

in the care of a baby. Simply give it what it needs until it is able to take care of itself. The plant may require a little watching and attention for a few days in warm weather. If an opportune storm comes, the question of growth is settled favorably at once; but if a "dry spell" ensues, be vigilant. At nine o'clock A.M., even well-watered plants may begin to wilt, showing that they require shade, which may be supplied by inverted flower-pots, old berry-baskets, shingles or boards. A handful of weeds, grass, or even of dry earth, thrown on the crown of the plant in the morning, and removed by five P.M., is preferable to nothing. Anything is better than stolidly sticking a plant in the ground and leaving it alone just long enough to die. Many, on the other hand, kill their plants with kindness. They dose the young things with guano, unfermented manure, and burn them up. Coolness, moisture, and shade are the conditions for a new start in life.

As has been explained already, pot-grown plants, with a ball of earth clinging to their roots, can be set out during the hot months with great ease, and with little danger of loss. At the same time, let me distinctly say that such plants require fair treatment. The ground should be "firmed" around them just as strongly, and they should be so well watched as to guard against the slightest wilting from heat and drought.

In ordinary field culture, let the rows be three feet apart, and let the plants stand one foot from each other in a row. At this distance, 14,520 are required for an acre. When land is scarce, the rows can be two and a half feet from each other. In garden culture, where the plow and cultivator will not be used, there should be two feet between the rows, and the plants should be one foot apart as before. With this rule in mind, any one can readily tell how many plants he will need for a given area.

CHAPTER XV

CULTIVATION

THE field for experiment in cultivation with different fertilizers, soils, climates, and varieties is indeed a wide one, and yet for practical purposes the question is simple enough.

There are three well-known systems of cultivation, each of which has its advantages and disadvantages. The first is termed the "matted bed system." Under this plan the ground between the rows is cultivated and kept clean during the spring and early summer. As soon, however, as the new runners begin to push out vigorously, cultivation ceases, or else, with the more thorough, the cultivator is narrowed down till it stirs scarcely more than a foot of surface, care being taken to go up one row and down another, so as always to draw the runners one way. This prevents them from being tangled up and broken off. By winter, the entire ground is covered with plants, which are protected as will be explained further on. In the spring the coarsest of the covering is raked off, and between the rows is dug a space about a foot or eighteen inches wide, which serves as a path for the pickers. This path is often cheaply and quickly made by throwing two light furrows together with a corn plow. Under this system, the first crop is usually the best, and in strong lands adapted to grasses the beds often become so foul that it does not pay to leave them to bear a second year. If so, they are plowed under

as soon as the fruit has been gathered. More often two crops are taken, and then the land is put in some other crop for a year or two before being planted with strawberries again. This rude, inexpensive system is perhaps more followed than any other. It is best adapted to light soils and cheap lands. Where an abundance of cool fertilizers has been used, or the ground has been generously prepared with green crops, plowed under, the yield is often large and profitable. But as often it is quite the reverse, especially if the season proves dry and hot. Usually, plants sodded together cannot mature fine fruit, especially after they have exhausted half their vitality in running. In clayey loams, the surface in the matted rows becomes as hard as a brick. Light showers make little impression on it, and the fruit often dries upon the vines. Remembering that the strawberry's chief need is moisture, it will be seen that it can scarcely be maintained in a hard-matted sod. Under this system the fruit is small at best, and it all matures together. If adopted in the garden, the family has but a few days of berries instead of a few weeks. The marketman may find his whole crop ripening at a time of over-supply, and his small berries may scarcely pay for picking. To many of this class the cheapness of the system will so commend itself that they will continue to practice it until some enterprising neighbor teaches them better, by his larger cash returns. In the garden, however, it is the most expensive method. When the plants are sodded together, the hoe and fork cannot be used. The whole space must be weeded by hand, and there are some pests whose roots interlace horizontally above and below the ground, and which cannot be eradicated from the matted rows. Too often, therefore, even in the neatest garden, the strawberry bed is the place where vegetable evil triumphs.

There are modifications of this system that are seen to better advantage on paper than in the field or garden. The one most often described in print—I have never seen it working successfully—may be termed the "renewal sys-

tem." Instead of plowing the matted beds under, after the first or second crop, the paths between the beds are enriched and spaded or plowed. The old plants are allowed to fill these former paths with new plants; which process being completed, the old matted beds are turned under, and the new plants that have taken the places of the paths bear the fruit of the coming year. But suppose the old beds have within them sorrel, white clover, wire-grass, and a dozen other perennial enemies, what practical man does not know that these pests will fill the vacant spaces faster than can the strawberry plants? There is no chance for cultivation by hoe or horse power. Only frequent and laborious weedings by hand can prevent the evil, and this but partially, for, as has been said, the roots of many weeds are out of reach unless there is room for the fork, hoe, or cultivator to go beneath them.

In direct contrast with the above is the "hill system." This, in brief, may be suggested by saying that the strawberry plants are set out three feet—more or less—apart, and treated like hills of corn, with the exception that the ground is kept level, or should be. They are often so arranged that the cultivator can pass between them each way, thus obviating nearly all necessity for hand work. When carried out to such an extent, I consider this plan more objectionable than the former, especially at the North. In the first place, when the plants are so distant from each other, much of the ground is left unoccupied and unproductive. In the second place, the fruit grower is at the mercy of the strawberry's worst enemy, the *Lachnosterna*, or white grub. Few fields in our region are wholly free from them and a few of the voracious pests would leave the ground bare, for they devour the roots all summer long. In the third place, where so much of the ground is unoccupied, the labor of mulching, so that the soil can be kept moist and the fruit clean, is very great.

In small garden-plots, when the plants can be set only two feet apart each way, the results of this system are often

most admirable. The entire spaces between them can be kept mellow and loose, and therefore moist. There is room to dig out and eradicate the roots of the worst weeds. By frequently raking the ground over, the annual weeds do not get a chance to start. In the rich soil the plants make great, bushy crowns that nearly touch each other, and as they begin to blossom, the whole space between them can be mulched with straw, grass, etc. The runners can easily be cut away when the plants are thus isolated. Where there are not many white grubs in the soil, the hill system is well adapted to meet garden culture, and the result, in a prolonged season of large, beautiful fruit, will be most satisfactory. Moreover, the berries, being exposed on all sides to the sun, will be of the best flavor.

In the South, the hill system is the only one that can be adopted to advantage. There the plants are set in the summer and autumn, and the crop is taken from them the following spring. Therefore each plant must be kept from running, and be stimulated to do its best within a given space of time. In the South, however, the plants are set but one foot apart in the rows, and thus little space is lost.

I am satisfied that the method best adapted to our Eastern and Western conditions is what is termed the "narrow row system," believing that it will give the greatest amount of fine fruit with the least degree of trouble and expense. The plants are set one foot from each other in line, and not allowed to make runners. In good soil, they will touch each other after one year's growth, and make a continuous bushy row. The spaces between the rows may be two and a half to three feet. Through these spaces the cultivator can be run as often as you please, and the ground can be thus kept clean, mellow, and moist. The soil can be worked —not deeply, of course—within an inch or two of the plants, and thus but little space is left for hand-weeding. I have found this latter task best accomplished by a simple tool made of a fork-tine, with a section of the top left attached,

thus: T. Old broken forks can thus be utilized. This tool can be thrust deeply between the plants without disturbing many roots, and the most stubborn weed can be pried out. Under this system, the ground is occupied to the fullest extent that is profitable. The berries are exposed to light and air on either side, and mulch can be applied with the least degree of trouble. The feeding-ground for the roots can be kept mellow by horse-power; if irrigation is adopted, the spaces between the rows form the nat-

NARROW ROW AND HILL SYSTEMS

ural channels for the water. Chief of all, it is the most successful way of fighting the white grub. These enemies are not found scattered evenly through the soil, but abound in patches. Here they can be dug out if not too numerous, and the plants allowed to run and fill up the gaps. To all intents and purposes, the narrow row system is hill culture with the evils of the latter subtracted. Even where it is not carried out accurately, and many plants take root in the rows, most of them will become large, strong, and

productive under the hasty culture which destroys the greater number of the side-runners.

Where this system is fairly tried, the improvement in the quality, size, and, therefore, measuring bulk of the crop, is astonishing. This is especially true of some varieties, like the Duchess, which, even in a matted bed, tends to stool out into great bushy plants. Doctor Thurber, editor of the "American Agriculturist," unhesitatingly pronounced it the most productive and best early variety in my specimen-bed, containing fifty different kinds. If given a chance to develop its stooling-out qualities, it is able to compete even with the Crescent and Wilson in productiveness. At the same time its fruit becomes large, and as regular in shape as if turned with a lathe. Many who have never tried this system would be surprised to find what a change for the better it makes in the old popular kinds, like the Charles Downing, Kentucky, and Wilson. The Golden Defiance also, which is so vigorous in the matted beds that weeds stand but little chance before it, almost doubles in size and productiveness if restricted to a narrow row.

The following remarks will have reference to this system, as I consider it the best. We will start with plants that have just been set out. If fruit is our aim, we should remember that the first and strongest impulse of each plant will be to propagate itself; but to the degree that it does so it lessens its own vitality and power to produce berries the following season. Therefore every runner that a plant makes means so much less and so much smaller fruit from that plant. Remove the runners as they appear, and the life of the plant goes to make vigorous foliage and a correspondingly large fruit bud. The sap is stored up as a miller collects and keeps for future use the water of a stream. Moreover, a plant thus curbed abounds in vitality and does not throw down its burden of prematurely ripe fruit after a few hot days. It works evenly and continuously, as strength only can, and leisurely perfects the last berry on the vines. You will often find blossoms and ripe fruit on the same

plant—something rarely seen where the plants are crowded and the soil dry. I have had rows of Triomphe de Gand in bearing for seven weeks.

With these facts before us, the culture of strawberries is simple enough. A few days after planting, as soon as it is evident that they will live, stir the surface just about them *not more than half an inch* deep. Insist on this; for most workmen will half hoe them out of the ground. A fine-tooth rake is one of the best tools for stirring the surface merely. After the plants become well rooted, keep the ground mellow and clean as you would between any other hoed crop, using horse-power as far as possible, since it is the cheapest and most effective. If the plants have been set out in spring, take off the fruit buds as soon as they appear. Unless the plants are very strong and are set out very early, fruiting the same year means feebleness and often death. If berries are wanted within a year, the plants must be set in summer or autumn. Then they can be permitted to bear all they will the following season. A child with a pair of shears or a knife, not too dull, can easily keep a large garden-plot free from runners, unless there are long periods of neglect. Half an hour's work once a week, in the cool of the evening, will be sufficient. A boy paid at the rate of twenty-five cents a day can keep acres clipped if he tries.

If the ground were poor, or one were desirous of large fruit, it would be well to give a liberal autumn top-dressing of fine compost or any well-rotted fertilizer not containing crude lime. Bone-dust and wood-ashes are excellent. Scatter this along the rows, and hoe it in the last time they are cultivated in the fall.

With the exception of guano and other quick-acting stimulants, I believe in fall top-dressing. The melting snows and March rains carry the fertilizing properties down to the roots, which begin growing and feeding very early in the spring. If compost or barnyard manure is used, it aids in protecting the plants during the winter, warms and mellows

the soil, and starts them into a prompt, vigorous growth, thus enabling them to store up sufficient vitality in the cool growing season to produce large fruit in abundance. If top-dressings are applied in the spring, and a dry period follows, they scarcely reach the roots in time to aid in forming the fruit buds. The crop of the following year, however, will be increased. Of course, it is far better to top-dress the rows in spring than not at all. I only wish to suggest that usually the best results are obtained by doing this work in the fall; and this would be true especially of heavy soils.

When the ground begins to freeze, protect the plants for the winter by covering the rows lightly with straw, leaves, or—better than all—with light, strawy horse-manure, that has been piled up to heat and turned over once or twice, so that in its violent fermentation all grass seeds have been killed. Do not cover so heavily as to smother the plants, nor so lightly that the wind and rains will dissipate the mulch. Your aim is not to keep the plants from freezing, but from freezing and thawing with every alternation of our variable winters and springs. On ordinarily dry land two or three inches of light material is sufficient. Moreover, the thawing out of the fruit buds or crown, under the direct rays of the sun, injures them, I think. Most of the damage is done in February and March. The good gardener watches his plants, adds to the covering where it has been washed away or is insufficient, and drains off puddles, which are soon fatal to all the plants beneath them. Wet ground, moreover, heaves ten times as badly as that which is dry. If one neglects to do these things, he may find half of the plants thrown out of the ground, after a day or two of alternate freezing and thawing. Good drainage alone, with three or four inches of covering of light material, can prevent this, although some varieties, like the Golden Defiance, seem to resist the heaving action of frost remarkably. Never cover with hot, heavy manure, nor too deeply with leaves, as the rains beat these

down too flatly. Let the winter mulch not only cover the row, but reach a foot on either side.

Just before very cold weather begins—from the middle of November to December 1st, in our latitude—we may, if we choose, cover our beds so deeply with leaves, or litter of some kind, as to keep out the frost completely. We thus may be able to dig plants on mild winter days and early spring, in case we have orders from the far South. This heavy covering should be lightened sufficiently early in the spring to prevent smothering. Plants well protected have a fine green appearance early in spring, and, even if no better, will give much better satisfaction than those whose leaves are sere and black from frost.

As the weather begins to grow warm in March, push aside the covering a little from the crown of the plants, so as to let in air. If early fruit is desired, the mulch can be raked aside and the ground worked between the rows, as soon as danger of severe frost is over. If late fruit is wanted, let in air to the crown of the plants, but leave the mulch on the ground, which is thus shielded from the sun, warm showers, and the south wind, for two or three weeks.

I have now reached a point at which I differ from most horticultural writers. As a rule, it is advised that there be no spring cultivation of bearing plants. It has been said that merely pushing the winter mulch aside sufficiently to let the new growth come through is all that is needed. I admit that the results are often satisfactory under this method, especially if there has been deep, thorough culture in the fall, and if the mulch between and around the plants is very abundant. At the same time, I have so often seen unsatisfactory results that I take a decided stand in favor of spring cultivation if done properly and *sufficiently early*. I think my reasons will commend themselves to practical men. Even where the soil has been left mellow by fall cultivation, the beating rains and the weight of melting snows pack the earth. All loamy land settles

and tends to grow hard after the frost leaves it. While the mulch checks this tendency, it cannot wholly prevent it. As a matter of fact, the spaces between the rows are seldom thoroughly loosened late in the fall. The mulch too often is scattered over a comparatively hard surface, which by the following June has become so solid as to suffer disastrously from drought in the blossoming and bearing season. I have seen well-mulched fields with their plants faltering and wilting, unable to mature the crop because the ground had become so hard that an ordinary shower could make but little impression. Moreover, even if kept moist by the mulch, land long shielded from sun and air tends to become sour, heavy, and devoid of that life which gives vitality and vigor to the plant. The winter mulch need not be laboriously raked from the garden-bed or field, and then carted back again. Begin on one side of a plantation and rake toward the other, until three or four rows and the spaces between them are bare; then fork the spaces, or run the cultivator—often the subsoil plow—deeply through them, and then immediately, before the moist, newly made surface dries, rake the winter mulch back into its place as a summer mulch. Then take another strip and treat it in like manner, until the generous impulse of spring air and sunshine has been given to the soil of the entire plantation.

This spring cultivation should be done early—as soon as possible after the ground is dry enough to work. The roots of a plant or tree should never be seriously disturbed in the blossoming or bearing period; and yet I would rather stir the *surface*, even when my beds were in full bloom, than leave it hard, baked, and dry; for, heed this truth well—unless a plant, from the time it blossoms until the fruit matures, has an abundance of moisture, it will fail in almost the exact proportion that moisture fails. A liberal summer mulch under and around the plants not only keeps the fruit clean, but renders a watering much more lasting, by shielding the soil from the sun. Never sprinkle the

plants a little in dry weather. If you water at all, *soak* the ground and *keep it moist all the time* till the crop matures. Insufficient watering will injure and perhaps destroy the best of beds. But this subject and that of irrigation will be treated in a later chapter.

When prize berries are sought, enormous fruit can be obtained by the use of liquid manure, but it should be applied with skill and judgment, or else its very strength may dwarf the plants. In this case, also, all the little green berries, save the three or four lowest ones, may be picked from the fruit truss, and the force of the plant will be expended in maturing a few mammoth specimens. Never seek to stimulate with plaster or lime, directly. Other plants' meat is the strawberry's poison in respect to the immediate action of these two agents. Horse manure composted with muck, vegetable mould, wood-ashes, bone meal, and, best of all, the product of the cow-stable, if thoroughly decayed and incorporated with the soil, will probably give the largest strawberries that can be grown, if steady moisture, but not wetness, is maintained.

Many advise the mowing off of the old foliage after the fruit has been gathered. I doubt the wisdom of this practice. The crowns of the plants and the surface of the bed are laid open to the midsummer sun. The foliage is needed to sustain or develop the roots. In the case of a few petted and valuable plants, it might be well to take off some of the old dying leaves, but it seems reasonable to think that the wholesale destruction of healthful foliage must be a severe blow to the vitality of the plants. Still, the beds should not be left to weeds and drought. Neglect would be ungracious, indeed, just after receiving such delicious gifts. I would advise that the coarsest of the mulch be raked off and stored for winter covering, and then the remainder forked very lightly or cultivated into the soil, as a fertilizer immediately after a soaking rain, but not when the ground is dry. Do not disturb the roots of a plant during a dry period. Many advise a liberal manuring after the

fruit is gathered. This is the English method, and is all right in their humid climate, but dangerous in our land of hot suns and long droughts. Dark-colored fertilizers absorb and intensify the heat. A sprinkling of bone dust can be used to advantage as a summer stimulant, and stronger manures, containing a larger per cent of nitrogen, can be applied just before the late fall rains. A plant just after bearing needs rest.

After fruiting, the foliage of some of our best kinds turns red and seemingly burns and shrivels away. This is not necessarily a disease, but merely the decay of old leaves which have fulfilled their mission. From the crown a new and vigorous growth will eventually take their place.

When one is engaged in the nursery business, the young plants form a crop far more valuable than the fruit. Therefore, every effort is made to increase the number of runners rather than to destroy them. Stimulating manures, which promote a growth of vines rather than of fruit, are the most useful. The process of rooting is often greatly hastened by layering; that is, by pressing the incipient plant forming on the runner into the soil, and by laying on it a pebble or lump of earth to keep it in its place. When a bed is closely covered with young plants that have not taken root, a top-dressing of fine compost will greatly hasten their development. Moisture is even more essential to the nurseryman than to the fruit grower, and he needs it especially during the hot months of July, August, and September, for it is then that the new crop of plants is growing. Therefore, his need of damp but well-drained ground; and if the means of irrigation are within his reach, he may accomplish wonders, and can take two or three crops of plants from the same area in one season.

While the growing of strawberry plants may be very profitable, it must be expensive, since large areas must be laboriously weeded by hand several times in the season. Instead of keeping the spaces between the rows clear, for the use of horse-power, it is our aim to have them covered

as soon as possible with runners and young plants. The Golden Defiance, Crescent Seedling and a few others will keep pace with most weeds, and even master them; but nearly all varieties require much help in the unequal fight, or our beds become melancholy examples of the survival of the unfittest.

CHAPTER XVI

A SOUTHERN STRAWBERRY FARM, AND METHODS OF CULTURE IN THE SOUTH

HAVING treated of the planting of strawberries, their cultivation, and kindred topics, in that great northern belt, of which a line drawn through New York city may be regarded as the centre, I shall now suggest characteristics in the culture of this fruit in southern latitudes. We need not refer to the oldest inhabitant, since the middle-aged remember when even the large cities of the North were supplied from the fields in the suburbs, and the strawberry season in town was identical with that of the surrounding country. But a marvellous change has taken place, and berries from southern climes appear in our markets soon after midwinter. This early supply is becoming one of the chief industries of the South Atlantic coast, and every year increases its magnitude. At one time, southern New Jersey furnished the first berries, but Maryland, Delaware, and Virginia soon began to compete. Norfolk early took the lead in this trade, and even before the war was building up a fine business. That event cut off our Southern supply, and for a few years June and strawberries again came together. But after the welcome peace, many Southern fields grew red once more, but not with blood, and thronged, but chiefly by women and children. Soil, climate, and superb water communications speedily restored to Norfolk the vantage which she will probably maintain; but fleet steamers are giving more southern ports a chance. Charleston, South Carolina, is second only in importance. In the spring of '79, every week four steamers were loaded for New York, and strawberries formed no

insignificant proportion of the freight. Indeed, the supply from Charleston was so large that the price in April scarcely repaid the cost of some shipments. The proprietor of a commission house, largely engaged in the Southern fruit trade, told me he thought that about one third as many strawberries came from Charleston as from Norfolk. From careful inquiries made on the ground, I am led to believe—if it has not already attained this position—that Norfolk is rapidly becoming the largest strawberry centre in the world, though Charleston is unquestionably destined to become its chief rival in the South. The latter city, however, has not been able to monopolize the far Southern trade, and never have I seen a finer field of strawberries than was shown me in the suburbs of Savannah. It consisted of a square of four acres, set with Neunan's Prolific, the celebrated Charleston berry.

And now Florida, with its unrivalled oranges, is beginning to furnish tons of strawberries, that begin ripening in our midwinter; and, with its quick, sandy soil and sunny skies, threatens to render the growing of this fruit under glass unprofitable. I saw last winter, at Mandarin, quite an extensive strawberry farm, under the care of Messrs. Bowen Brothers, and was shown their skilful appliances for shipping the fruit. At Jacksonville, also, Captain William James is succeeding finely in the culture of some of our Northern varieties, the Seth Boyden taking the lead.

I think I can better present the characteristics of strawberry culture in the South by aiming to give a graphic picture of the scenes and life on a single farm than is possible by general statements of what I have witnessed here and there. I have therefore selected for description a plantation at Norfolk, since this city is the centre of the largest trade, and nearly midway in the Atlantic strawberry belt. I am also led to make this choice because here is to be found, I believe, the largest strawberry farm in the world, and its varied labors illustrate most of the Southern aspects of the question.

The reader may imagine himself joining our little party on a lovely afternoon about the middle of May. We took one of the fine, stanch steamers of the Old Dominion line at three P.M., and soon were enjoying, with a pleasure that never palls, the sail from the city to the sea. Our artistic leader, whose eye and taste were to illumine and cast a glamour over my otherwise matter-of-fact text, was all aglow with the varied beauties of the scene, and he faced the prospect beyond the "Hook" with no more misgivings than if it were a "painted ocean." But there are occasions when the most heroic courage is of no avail.

Only in the peace and beauty that crowned the closing hours of the day as we steamed past Fortress Monroe and up the Elizabeth river, did the prosaic fade out of the hours just past, and now before us was the "sunny South" and strawberries and cream.

In the night there was a steady downfall of rain, but sunshine came with the morning, and we found that the spring we had left at the North was summer here, and saw that the season was moving forward with quickened and elastic tread. Before the day grew warm we started from our hotel at Norfolk for the strawberry plantation, rattling and bouncing past comfortable and substantial homes, over a pavement that surpassed even the ups and downs of fortune. Here and there, surrounded by a high brick wall, would be seen a fine old mansion, embowered in a wealth of shrubbery and foliage that gave, even in the midst of the city, a suburban seclusion. The honeysuckle and roses are at home in Norfolk, and their exquisite perfume floated to us across the high garden fences. Thank Heaven! some of the best things in the world cannot be walled in. St. Paul's Church and quaint old burying-ground, shadowed by trees, festooned with vines, and gemmed with flowers, seemed so beautiful, as we passed, that we thought its influence on the secular material life of the people must be almost as good through the busy week as on the Sabbath.

The houses soon grew scattering, and the wide, level,

open country stretched away before us, its monotony broken here and there by groves of pine. The shell road ceased and our wheels now passed through many deep puddles, which in Virginia seem sacred, since they are preserved year after year in exactly the same places. A more varied class of vehicles than we met from time to time would scarcely be seen on any other road in the country. There were stylish city carriages and buggies, grocer and express wagons, great lumbering market trucks laden with barrels of early cabbages, spring wagons, drawn by mules, piled up with crates from many a strawberry field in the interior, and so, on the descending scale, till we reach the two-wheeled, primitive carts drawn by cows—all converging toward some Northern steamer, whose capacious maw was ready to receive the produce of the country. We had not proceeded very far before we saw in the distance a pretty cottage, sheltered by a group of tall, primeval pines, and on the right of it a large barn-like building, with a dwelling, office, smithy, sheds, etc., grouped about it. A previous visit enabled me to point out the cottage as the home of the proprietor, and to explain that the seeming barn was a strawberry crate manufactory. As was the case on large plantations in the olden time, almost everything required in the business is made on the place, and nearly every mechanical trade has a representative in Mr. Young's employ.

As we drove up under the pines, the proprietor of the farm welcomed us with a cordial hospitality, which he may have acquired in part from his residence in the South. On the porch stood a slender lady, whose girlish grace and delicate beauty at once captivated the artists of our party.

There was the farm we had come to see, stretching away before us in hundreds of green, level acres. As we drove to a distant field in which the pickers were then engaged, we could see the ripening berries with one side blushing toward the sun. Passing a screen of pines, we came out into a field containing thirteen acres of Wilson strawberries, and then more fully began to realize the magnitude of the

business. Scattered over the wide area, in what seemed inextricable confusion to our uninitiated eyes, were hundreds of men, women, and children of all ages and shades of color, and from the field at large came a softened din of voices, above the monotony of which arose here and there snatches of song, laughter mellowed by distance, and occasionally the loud, sharp orders of the overseers, who stalked hither and thither, wherever their "little brief authority" was most in requisition.

We soon noted that the confusion was more apparent than real, and that each picker was given a row over which he—or, more often, she—bent with busy fingers until it was finished. At central points crates were piled up, and men known as "buyers" received the round quart baskets from the trays of the pickers, while wide platform carts, drawn by mules, were bringing empty crates and carrying away those that had been filled.

Along the road that skirted the field, and against a pretty background of half-grown pines, motley forms and groups were moving to and fro, some seeking the "buyers" with full trays, others returning to their stations in the field with a new supply of empty baskets. Some of the pickers were drifting away to other fields, a few seeking work late in the day; more, bargaining with the itinerant venders of pies, made to last all summer if not sold, gingerbread, "pones," and other nondescript edibles, at which an ostrich would hesitate in well-grounded fear of indigestion, but for which sable and semi-sable pickers exchange their berry tickets and pennies as eagerly as we buy Vienna rolls. Two or three barouches and buggies that had brought visitors were mingled with the mule-carts; and grouped together for a moment might be seen elegantly attired ladies from New York, slender mulatto girls, clad in a single tattered gown which scantily covered their bare ankles and feet, and stout, shiny negro women, their waists tied with a string to prevent their flowing drapery from impeding their work. Flitting to and fro were numberless colored children, bare-

headed, bare-legged, and often with not a little of their sleek bodies gleaming through the innumerable rents of their garments, their eyes glittering like black beads, and their white teeth showing on the slightest provocation to mirth. Indeed, the majority of the young men and women were chattering and laughing much of the time, and only those well in the shadow of age worked on in a stolid, plodding manner. Mingled indiscriminately with the colored people were not a few white women and children, and occasionally a white man. As a rule, these were better dressed, the white girls wearing sun-bonnets of portentous size, whose cavernous depths would make a search for beauty on the part of our artist a rather close and embarrassing scrutiny. The colored women as often wore a man's hat as any other, and occasionally enlivened the field with a red bandana. Over all the stooping, moving, oddly apparelled forms, a June-like sun was shining with summer warmth. Beyond the field a branch of Tanner's Creek shimmered in the light, tall pines sighed in the breeze on the right, and from the copse-wood at their feet quails were calling, their mellow whistle blending with the notes of a wild Methodist air. In the distance rose the spires of Norfolk, completing a picture whose interest and charm I have but faintly suggested.

Several of the overseers are negroes, and we were hardly on the ground before one of these men, in the performance of his duty, shouted in a stentorian voice:

"Heah, you! Git up dar, you long man, off'n yer knees. What yo' mashin' down a half-acre o' berries fer?"

Mr. Sheppard was quick to see a good subject, and almost in a flash he had the man posed and motionless in his attitude of authority, and under his rapid strokes Jackson won fame and eminence, going to his work a little later the hero of the field. The overseer's task is a difficult one, for the pickers least given to prayer are oftenest on their knees, crushing the strawberries, and whether they are "long" or short, much fruit is destroyed. North and South, the effort to keep those we employ off the berries must be constant,

especially as a long, hot day is waning. Indeed, one can scarcely blame them for "lopping down," for it would be inquisitorial torture to most of us to stoop upon our feet through a summer day. Picking strawberries, as a steady business, is wofully prosaic.

While the sun had been shining so brightly there had been an occasional heavy jar and rumble of thunder, and now the western sky was black. Gradually the pickers had disappeared from the Wilson field, and we at last followed them, warned by an occasional drop of rain to seek the vicinity of the house. Having reached the grassy slope beneath the pines in the rear of the dwelling, we turned to note the pretty scene. A branch of Tanner's Creek came up almost to our feet, and on either side of it stretched away long rows of strawberries as far as the eye could reach. Toward these the throng of pickers now drifted, "seeking fresh fields and pastures new." The motley crowd was streaming down on either side of the creek, while across a little causeway came a counter current, the majority of them having trays full of berries. The buyers, like the traders with the nomad Indians, open traffic anywhere, and at the shortest notice. A mule-cart was stopped, a few empty crates taken off and placed under the pines at our feet, and soon the grass was covered with full quart baskets, for which the pickers received tickets and then passed on, or, as was often the case, threw themselves down in the shade. The itinerant venders came flocking in like so many buzzards. There was at once chaffering and chaffing, eating and drinking. All were merry. Looking on the groups before us, one would imagine that the sky was serene. And yet, frowning upon this scene of careless security, this improvident disregard of a swiftly coming emergency, was one of the blackest of clouds. Every moment the thunder was jarring and rolling nearer, and yet this jolly people, who "take no thought," heeded not the warning. Even the buyers and packers seemed infected with a like spirit, and were leisurely packing in crates the baskets

of berries scattered on the grass, when suddenly Mr. Young, with his fleet, black horse, came flying down upon us. Standing up in his buggy, he gave a dozen rapid orders, like an officer on the field in a critical moment. The women, who had been lounging with their hands on their hips, shuffled off with their trays; half-burned pipes are hastily emptied; gingerbread and like delicacies are stuffed into capacious mouths, since hands must be employed at once. Packers, mules, everybody, everything, are put upon the double-quick to prepare for the shower. It is too late, however, for down come the huge drops as they can fall only in the South. The landscape grows obscure, the forms of the pickers in the distance become dim and misty, and when at last it lightens up a little, they have disappeared from the fields. There they go, streaming and dripping toward the barns and sheds, looking as bedraggled as a flock of black Spanish fowls. Such of the mule-drivers as have been caught, now that they are in for it, drive leisurely by with the heavy crates that they should have gathered up more promptly.

The cloud did not prove a passing one, and the rain fell so long and copiously that further picking for the day was abandoned. Some jogged off to the city, at a pace that nothing but a fiery storm could have quickened. A hundred or two remained under the sheds, singing and laughing. Men and women, and many bright young negro girls, too, lighted their pipes and waited till they could gather at the "paying booth," near the entrance of the farm, after the rain was over. This booth was a small shop, extemporized of rough boards by an enterprising grocer of the city. One side was open, like the counter of a restaurant, and within, upon the grass, as yet untrodden, were barrels and boxes containing the edible enormities which seem indigenous to the semi-grocery and eating-house. In most respects the place resembled the sutler's stand of our army days. There was a small window on one end of the booth, and at this sat the grocer, metamorphosed into a paymaster, with a huge

bag of coin, which he rapidly exchanged for the strawberry tickets. Our last glimpse of the pickers, who had streamed out of the city in the gray dawn, left them in a long line, close as herrings in a box, pressing toward the window, from which came faintly the chink of silver.

As night at last closed about us, we realized the difference between a strawberry farm and a strawberry bed, or "patch," as country people say. Here was a large and well-developed business, which proved the presence of no small degree of brain power and energy; and our thoughts naturally turned to the proprietor and the methods by which he achieved success.

J. R. Young, Jr., is a veteran in strawberry culture, although but twenty-nine years of age. Mr. Young, Sr., was a Presbyterian clergyman who always had a leaning toward man's primal calling. When his son was a little boy, he was preaching at Plattsburgh, New York, and to his labors in the spiritual vineyard joined the care of a garden that was the pride of the town. Mr. Young, Jr., admits that he hated weeding and working among strawberries as much as any other boy, until he was given a share in the crop, and permitted to send a few crates to Montreal. He had seen but nine years when he shipped his first berries to market, and every summer since, from several widely separated localities and with many and varied experiences, he has sent to Northern cities increasing quantities of his favorite fruit. When but fifteen years of age he had the entire charge, during the long season, of three hundred "hands," and the large majority of them were Irish women and children. After considerable experience in strawberry farming in northern and southern New York and in New Jersey, his father induced him to settle at Norfolk, Virginia, and hither he came about ten years ago. Now he has under his control a farm of 440 acres, 150 of which are to-day covered with bearing strawberry plants. In addition, he has set out this spring over two million more plants, which will occupy an-

other hundred acres, so that in 1880 he will have 250 acres that must be picked over almost daily.

Mr. Young prefers spring planting in operations upon a large scale. Such a choice is very natural in this latitude, for they can begin setting the first of February and continue until the middle of April. Therefore, nine-tenths of the plants grown in this region are set out in spring. But at Charleston and further south, they reverse this practice, and, with few exceptions, plant in the summer and fall, beginning as early as July on some places, and continuing well into December.

I must also state that the finest new plantation that I saw on Mr. Young's place was a field of Seth Boydens set out in September.

This fact proves that he could follow the system of autumn planting successfully, and I am inclined to think that he will regard this method with constantly increasing favor. As an instance proving the adaptation to this latitude of the fall system of planting, I may state that 96,000 plants were sent to a gentleman at Richmond, in October, 1877, and when I visited his place, the following spring, there was scarcely a break in the long rows, and nearly fruit enough, I think, to pay for the plants. From his Seth Boydens, set out last September, Mr. Young will certainly pick enough berries to pay expenses thus far; and at the same time, the plants are already four times the size of any set out this spring. As the country about Norfolk is level, with spots where the water would stand in very wet weather, Mr. Young has it thrown up into slightly raised beds two and a half feet wide. This is done by plows, after the ground has been thoroughly prepared and levelled by a heavy, fine-toothed harrow. These ridges are but four or five inches high, and are smoothed off by an implement made for the purpose. Upon these beds, quite near the edges, the plants are set in rows twenty inches apart, while the depressed space between the beds is twenty-seven inches wide. This space is also designed for the paths. The rows and the proper distances

for the plants are designated by a "marker," an implement consisting of several wheels fastened to a frame and drawn by hand. On the rim of these wheels are two knobs shaped like an acorn. Each wheel marks a continuous line on the soft earth, and with each revolution the knobs make two slight but distinct depressions twelve inches apart; or, if the variety to be planted is a vigorous grower, he uses another set of wheels that indent the ground every fifteen inches. A plant is dropped at each indentation, and a gang of colored women follow with trowels, and by two or three quick, dexterous movements, imbed the roots firmly in the soil. Some become so quick and skilful as to be able to set out six or seven thousand a day, while four or five thousand is the average. With his trained band of twenty women, Mr. Young calls the setting of a hundred thousand plants a good day's work.

In April commences the long campaign against the weeds, which advance like successive armies. No sooner is one growth slain than a different and perhaps more pestiferous class rises in its place—the worst of the Philistines being nut-grass, quack-grass, and—direst foe of all—wire-grass.

This labor is reduced to its minimum by mule cultivation, and Mr. Young has on his farm a style of cultivator that is peculiarly adapted to the work. As this is his own invention, I will not describe it, but merely state that it enables him to work very close to the rows, and to stir the soil deeply without moving it or covering the plants. These cultivators are followed by women, with light, sharp hoes, who cut away the few weeds left between the plants. They handle these tools so deftly that scarcely any weeding is left to be done by hand; for, by a rapid encircling stroke, they cut within a half-inch of the plant. For several years past, I have urged upon Mr. Young the advantage of the narrow row system, and his own experience has led him to adopt it. He is now able to keep his immense farm free of weeds chiefly by mule labor, whereas, in his old system of matted

row culture it was impossible to keep down the grass, or prevent the ground from becoming hard and dry. He now restricts his plants to hills or "stools," from twelve to fifteen inches apart. The runners are cut from time to time with shoe-knives, the left hand gathering them up by a single rapid movement, and the right hand severing them by a stroke. One woman will, by this method, clip the runners from several acres during the growing season. To keep his farm in order, Mr. Young must employ seventy-five hands through the summer. The average wages for women is fifty cents, and for men seventy-five to ninety cents. In the item of cheap labor the South has the advantage of the North.

With the advent of autumn, the onslaught of weeds gradually ceases, and there is some respite in the labors of a Virginia strawberry farm.

At Charleston and further south, this respite is brief, for the winters there are so mild that certain kinds of weeds will grow all the time, and early in February they must begin to cultivate the ground and mulch the plants for bearing.

Bordering on Mr. Young's farm, and further up the creek, there are hundreds of acres of salt meadows. From these he has cut, in the autumn and early winter, two hundred tons of hay, and with his lighter floats it down to his wharf. In December, acre after acre is covered until all the plants are quite hidden from view. In the spring, this winter mulch is left upon the ground as the summer mulch, the new growth in most instances pushing its way through it readily. When it is too thick to permit this, it is pushed aside from the crowns of the plants.

Thus far he has given the bearing fields no spring culture, adopting the common theory that the ground around the plants must not be disturbed at this season. I advocate the opposite view, and believe in *early* spring culture, as I have already explained; and I think his experience this year will lead him to give my method a trial in 1880. The latter part of April and early May was very dry at

Norfolk, and the ground between the bearing plants became parched, hard, and in many instances full of weeds that had been developing through the long, mild spring of this region. Now I am satisfied that if he, and all others in this region who adopt the narrow row system, would loosen the ground deeply with a subsoil plow *early* in the season, before the plants had made any growth, and then stir and pulverize all the surface between the plants in the rows, they would increase the size and quantity of the berries at least one-third, and in many instances double the crop. It would require a very severe drought, indeed, to injure plants thus treated, and it is well known, also, that a porous, mellow soil will best endure too frequent rains. I have sometimes thought that light and air are as indispensable to the roots of plants as to the foliage.

The winter mulch need not prevent this spring culture. Let the men begin on one side of a field, and rake inward until half a dozen rows are uncovered. Down through these the subsoil plow and the cultivator can pass. Then the hay can be raked back again as the summer mulch, and a new space cleared, until the whole field is cultivated and the mulch left as it was before.

Now, however, it is not a surface like hard-pan that is covered, but a mellow soil in which the roots can luxuriate.

Mr. Young uses fertilizers, especially those containing ammonia, only to a limited extent, believing that while they undoubtedly increase the size of the fruit, they also render it soft and unfit for long carriage, and promote an undue growth of vine. This theory is true, to a certain extent, but I think the compensating benefits of fertilizers of almost any kind far outweigh the disadvantages. At his distance from the market, firmness in the berry is essential, but I think he will find this quality is dependent more upon the weather and the variety than upon the fertilizer. Of course, over-stimulation by hot manures will always produce an unwholesome, perishable growth, but a

good coat of well-rotted compost scattered down the rows, just before they receive their fall or spring culture, would be exceedingly beneficial in nine cases out of ten. I most heartily agree with him, however, that all fertilizers containing potash are peculiarly adapted to the strawberry.

Having considered his methods of planting and culture, we now return again to the culminating period in which the hopes and labors of the year are rewarded or disappointed. When we awoke the morning following our arrival, we found the landscape obscured by a dense fog. Through this, in dim, uncertain outline, throngs of pickers were streaming out from the city to Mr. Young's place and the strawberry farms beyond. The broad fields seemed all the more vast from the obscurity, and the stooping forms of the fruit-gatherers took on odd and fantastic shapes in the silvery mist.

But while we drank our coffee the sun sipped these morning vapors, and when we stepped out under the pines, the day was hourly growing brighter and warmer. The balmy, fragrant air, the meadow larks singing in the distance, the cheery voices of the pickers in an adjacent field, would tempt gloom itself to forget its care and stroll away through the sunlight.

The pickers were beginning to take possession of a field containing thirty acres of Triomphe de Gands, and we followed them, and there lighted on one of the oddest characters on the plantation—"Sam Jubilee," the "row-man," black as night, short, stout, and profane. It is Sam's business to give each picker a row of berries, and he carries a brass-headed cane as the baton of authority. As we came up, he was whirling a glazed hat of portentous size in one hand and gesticulating so wildly with his cane that one might think he was in convulsions of rage, but we soon learned that this was "his way."

"Heah, you, dah!" he vociferated, to the slouching, leisurely pickers that were drifting after him, "what's de matter wid yer j'ints? Step along lively, or by—" and then

came a volley of the most outlandish oaths ever uttered by a human tongue.

"Don't swear so, Sam," said Mr. Young.

"Can't help it, sah. Dey makes me swar. Feels as if I could bust inter ten thousand emptins, dey's so agerwatin. Heah, my sister, take dat row. You, gemlin" (to a white man), "take dat. Heah, chile, step in dar an' pick right smart, or I'll warm yer!"

Sam "brothers and sisters" the motley crowd he domineers like a colored preacher, but I fear he is not "in good and regular standing" in any church in Norfolk.

"He can give out rows more rapidly and systematically than any man I ever had," said Mr. Young; and we soon observed that wherever Jubilee led, with his stentorian voice and emphatic gestures, there was life and movement. Thus we learned that although there might be 1,500 people in the fields, there was no haphazard picking. Each one would be assigned a row, which could not be left until all the ripe berries on it were gathered.

Passing to and fro across the fields are the two chief overseers of the farm, Harrison and Peters, both apparently full-blooded negroes, but in the vernacular of the South, "right smart men." They have been with Mr. Young eight or ten years, and were promoted and maintain their position solely on the ground of ability and faithfulness. They go rapidly from one to another, noting whether they are picking the rows clean. They also take from each tray a basket at random, and empty it into another, thus discovering who are gathering green or imperfect berries. If the fruit falls much below the accepted standard, the baskets are confiscated and no tickets given for them, and if the picker continues careless he is sent out of the field.

Mr. Young says that he has never found any white overseers who could equal these men; and through the long year they drive on the work with tireless energy.

Indeed, Peters often has much ado to keep his energy under control. A powerful engine cannot always be safe,

and Peters slipped his bands one day to his cost. A woman would not obey him, and he threatened her with a pistol. Instead of obeying, she started to run. He fired and wounded her twice, and then tried to get off on the lame excuse that he did not know the pistol was loaded. The trouble was that he was overloaded. But his offence resulted more from these characteristics than from innate ugliness of temper. To make the business of the huge farm go has become his controlling passion; and he chafes at an obstacle like an obstructed torrent.

Harrison, his associate overseer, unites more discretion with his force, and he gave us an example of this fact. As we were strolling about, we found, seated at the end of the strawberry rows, a group consisting of two young women and two children, with a colored man standing near. They had been picking in partnership, we were informed by one of the young women, who was smoking a pipe, and who replied to our questions, scarcely taking the trouble to look up. She was about half white, and her face was singularly expressive of sensuousness and indolent recklessness.

"This man is your husband?" I suggested.

"No, he's only my brudder. My ole man is pickin' on anoder farm," she drawled out, between the whiffs of her pipe.

"I should think you and your husband would work together," I ventured.

"We doesn't. He goes about his business and I goes about mine," she remarked, with languid complacency.

Here is a character, I thought, as we passed on—the very embodiment of a certain kind of wilfulness. She would not resist or chafe at authority, but, with an easy, good-natured, don't-care expression, would do as she pleased, "though the heavens fell." A little later there was a heavy rumble of thunder in the west, and we met again the young woman whose marital relations resembled those of many of her fashionable sisters at the North. She was leading her small band from the field. The prospec-

tive shower was her excuse for going, but laziness the undoubted cause. Harrison, like a vigilant watch-dog, spied them and blustered up, never for a moment doubting that she would yield to his authority.

But he had met his match. She merely looked at him with her slow, quiet, indolent smile, in which there was not the faintest trace of irresolution or fear, and he knew that the moment he stepped out of the way, she would pass on. His loud expostulations and threats soon ceased. What could he do with that laughing woman, who no doubt had been a slave, but was now emancipated a trifle too completely? He might as well try to stop a sluggish tide with his hands. It would ooze away from him inevitably. The instincts of this people are quick. Harrison knew he was defeated, and his only anxiety now was to retreat in a way that would save appearances.

"I'se a-gwine home, M's'r Harrison," she said quietly. "You don't catch us gittin' wet ag'in."

"Oh, well, if you is 'fraid ob gittin' wet, s'pose I'll habe to let you off jus' dis once," he began, pompously; and here, fortunately, he saw a man leaving the field in the distance. There was a subject with which he could deal, and a line of retreat open at the same time; and away he went, therefore, vociferating all the more loudly that he might cover his discomfiture. The woman smiled a little more complacently and went on, with her old easy, don't-care swing, as she undoubtedly will, whithersoever her inclinations lead, to the end of her life. To crystallize such wayward, human atoms into proper forms, and make them useful, is a problem that would puzzle wiser heads than that of the overseer.

I think, however, that not only Harrison and Peters, but all who have charge of working people, rely too much on driving, and too little on encouraging and coaxing. An incident which occurred may illustrate this truth. My companion, Mr. Drake, soon mastered one of the labors of a strawberry farm—the gathering of the fruit—and out of

the plenitude of his benevolence essayed to teach a little sable how he could pick to better advantage.

"Put your basket down, sonny," he said. "Now you have two hands to work with instead of one—so, don't you see?"

"Dat's mighty good in you, Mas'r," said a woman near. "Lor bress you! de people 'ud jess jump over derselves tryin' to do the work if dey got sich good words, but de oberseer's so cross dat we gits 'umptuous and don't keer."

Still, to the majority, the strawberry season brings the halcyon days of the year. They look forward to it and enjoy it as a prolonged picnic, in which business and pleasure are equally combined. They are essentially gregarious, and this industry brings many together during the long bright days. The light work leaves their tongues free, and families and neighbors pick together with a ceaseless chatter, a running fire of rude, broad pleasantry, intermingled occasionally with a windy war of words in a jargon that becomes all the more uncouth from anger, but which rarely ends in blows.

We were continually impressed by their courage, buoyancy, animal spirits, or whatever it is that enables them to face their uncertain future so unconcernedly. Multitudes live like the birds, not knowing where their next year's nest will be, or how to-morrow's food will come. It *has* come, thus far, and this fact seems enough. In many instances, however, their humble fortunes are built on the very best foundations.

"What can you do after the berry season is over?" we asked a woman who had but one arm.

"I kin do what any other woman kin do," she said, straightening herself up. "I kin bake, cook, wash, iron, scrub—"

"That will do," I cried. "You are better off than most of us, for the world will always need and pay for your accomplishments."

The story of her life was a simple one. She did not

remember when she lost her arm, but only knew that it had been burned off. When scarcely more than an infant, she had been left alone in the little cabin by the slave mother, who probably was toiling in the tobacco field. There was a fire on the hearth—the rest can be imagined only too vividly. She is fighting out the battle of life, however, more successfully with her one hand than are multitudes of men with two. She is stout and cheery, and can "take keer of herself and children," she said.

Scattered here and there over the fields might be seen two heads that would keep in rather close juxtaposition up and down the long rows.

"Dey's pairin' off," was the explanation.

"You keep de tickets," said a buxom young woman to her mate, as he was about to take her tray, as well as his own, to the buyers.

"You are in partnership," I remarked.

"Yes, we is," she replied, with a conscious laugh.

"You are related, I suppose?"

"Well, not 'zackly—dat is—we's partners."

"How about this partnership business—does it not last sometimes after the strawberry season is over?"

"Oh, Lor' yes! Heaps on 'em gits fallen in love; den dey gits a-marryin' arter de pickin' time is done gone by."

"Now I see what your partnership means."

"Yah, yah, yah! You sees a heap more dan I's told you!" But her partner grinned most approvingly. We were afterward informed that there was no end to the love-making among the strawberry rows.

There are from fifty to one hundred and fifty pickers in a squad, and these are in charge of subordinate overseers, who are continually moving around among them, on the watch for delinquencies of all kinds. Some of these minor potentates are white and some black. As a rule, Mr. Young gives the blacks the preference, and on strictly business principles, too. "The colored men have more snap, and can get more work out of their own people," he says. By means of

these sub-overseers, large numbers can be transferred from one part of the farm to another without confusion.

Fortunes are never made in gathering strawberries, and yet there seems no dearth of pickers. The multitude of men, women, and children that streams out into the country every morning is surprisingly large. Five or six thousand bushels a day are often gathered in the vicinity of Norfolk, and the pickers rarely average over a bushel each. "Right smart hands," who have the good hap to be given full rows, will occasionally pick two bushels; but about thirty quarts per day is the usual amount, while not a few of the lazy and feeble bring in only eight or ten.

As has been already suggested, the pickers are followed by the buyers and packers, and to these men, at central points in the fields, the mule-carts bring empty crates. The pickers carry little trays containing six baskets, each holding a quart. As fast as they fill these, they flock in to the buyers. If a trayful, or six good quarts, are offered, the buyer gives the picker a yellow ticket, worth twelve cents. When less than six baskets are brought, each basket is paid for with a green ticket, worth two cents. These two tickets are eventually exchanged for a white fifty-cent ticket, which is cashed at the paying-booth after the day's work is over. The pickers, therefore, receive two cents for every quart of good, salable berries. If green, muddy, or decayed berries are brought in, they are thrown away or confiscated, and incorrigibly careless pickers are driven off the place. Every morning the buyers take out as many tickets of these three values as they think they can use, and are charged with the same by the book-keeper. Their voucher for all they pay out is another ticket, on which is printed "forty-five quarts," or just a crateful. Only Mr. Young and one other person have a right to give out the last-named tickets, and by night each buyer must have enough of them to balance the other tickets with which he was charged in the morning. Thus thousands of dollars change hands through the medium of four kinds of tickets not over an inch square, and by

means of them the financial part of gathering the crop is managed.

In previous years these tickets were received the same as money by any of the shops in the city, and on one occasion were counterfeited. Mr. Young now has his own printing-office, and gets them up in a way not easily imitated, nor does he issue them until just as the fruit begins to ripen. He has, moreover, given authority to one man only to cash these tickets. Thus there is little chance for rascality.

He also requires that no ticket shall be cashed until the fields have all been picked over. Were it not for this regulation, the lazy and the "bummers" would earn enough merely to buy a few drinks, then slink off. Now they must remain until all are through before they can get a cent. Peters and Harrison see to it that none are lying around in the shade, and thus, through the compulsion of system, many, no doubt, are surprised to find themselves at work for the greater part of the day.

And yet neither system nor Peters, with even his sanguinary reputation, is able alone to control the hordes employed. Of course the very dregs of the population are largely represented. Many go out on a "lark," not a few to steal, and some with the basest purposes. Walking continually back and forth through the fields, therefore, are two duly authorized constables and their presence only prevents a great deal of crime. Moreover, according to Virginian law, every landholder has the right to arrest thieves and trespassers. Up to the time of our visit, five persons had been arrested, and the fact that they were all white does not speak very well for our color. The law of the state requires that they shall be punished by so many lashes, according to the gravity of the offence, and by imprisonment. The whipping-post is one of the institutions, and man or woman, white or black, against whom the crime of stealing is proved, is stripped to the waist and lashed upon the bare back. Such ignominious punishment may prevent theft, but it must tend to destroy every vestige of self-respect and pride in crimi-

nals, and render them hopelessly reckless. Therefore, it should cease at once.

It must be admitted, however, that very little lawlessness was apparent. In no instance have I received a rude word while travelling in the South, while, on the other hand, the courtesy and kindness were almost unstinted.

The negroes about Norfolk certainly do not wear an intimidated or "bull-dozed" air.

"Git off my row, dar, or I'll bust yo' head open," shouted a tall, strapping colored girl to a white man, and he got off her row with alacrity.

Mr. Young says that the negro laborers are easily managed, and will endure a great deal of severity if you deal "squarely" with them; but if you wrong them out of even five cents, they will never forget it. What's more, every citizen of "Blackville" will be informed of the fact, for what one knows they all seem to know very soon.

We were not long in learning to regard the strawberry farm as a little world within itself. It would be difficult to make the reader understand its life and "go" at certain hours of the day. Scores are coming and going; hundreds dot the fields; carts piled up with crates are moving hither and thither. At the same time the regular toil of cultivation is maintained. Back and forth between the young plants mules are drawing cultivators, and following these come a score or two women with light, sharp hoes. From the great crate manufactory is heard the whir of machinery and the click of hammers; at intervals the smithy sends forth its metallic voice, while from one centre of toil and interest to another the proprietor whisks in his open buggy at a speed that often seems perilous.

After all, Mr. Young's most efficient aid in his business was his father (recently deceased). It gave me pleasure to note the frequency and deference with which the senior's judgment was consulted, and I also observed that wherever the old gentleman's umbrella was seen in the field, all went well.

At four or five in the afternoon, the whole area would be picked over. The fields would be left to meadow-larks and quails, whose liquid notes well replaced the songs and cries of the pickers. Here and there a mule-cart would come straggling in. By night, all signs of life were concentrated around the barns and paying booth; but even from these one after another would drift away to the city, till at last scarcely a vestige of the hurry and business of the day would be left. The deep hush and quiet that settled down on the scene was all the more delightful from contrast. To listen to the evening wind among the pines, to watch the sun drop below the spires of Norfolk, and see the long shadows creep toward us; to let our thoughts flit whither they would, like the birds about us, was all the occupation we craved at this hour. Were we younger and more romantic, we might select this witching time for a visit to an ancient grave in one of the strawberry fields.

A mossy, horizontal slab marks the spot, and beneath it reposes the dust of a young English officer. One bright June day—so the legend is told—one hundred and sixteen years ago, this man, in the early summer of his life, was killed in a duel.

Lingering here, through the twilight, until the landscape grows as obscure as this rash youth's history, what fancies some might weave. As the cause of the tragedy, one would scarcely fail to see among the shadows the dim form and features of some old-time belle, whose smiles had kindled the fierce passion that was here quenched, more than a century since. Did she marry the rival, of surer aim and cooler head and heart, or did she haunt this place with regretful tears? Did she become a stout, prosaic woman, and end her days in whist and all the ancient proprieties, or fade into a remorseful wraith that still haunts her unfortunate lover's grave? One shivers, and grows superstitious. The light twinkling from the windows of the cottage under the pines becomes very attractive. As we fall asleep after such

a visit, we like to think of the meadow-larks singing on the mossy tombstone in the morning.

During a rainy day, when driven from the field, we found plenty to interest us in the printing-office, smithy, and especially in the huge crate manufactory. Here were piled up coils of baskets that suggested strawberries for a million supper-tables. Hour after hour the mule-power engine drove saws, with teeth sharper than those of time, through the pine boards that soon became crates for the round quart baskets. These crates were painted green, marked with Mr. Young's name, and piled to the lofty, cobwebbed ceiling.

But Saturday is the culminating period of the week. The huge plantation has been gone over closely and carefully, for the morrow is Sunday, on which day the birds are the only pickers. Around the office, crate manufactory, and paying booth were gathered over a thousand people—a motley and variegated crowd, that the South only can produce. The odd and often coarse jargon, the infinite variety in appearance and character, suggested again that humanity is a very tangled problem. The shrewdness and accuracy, however, with which the most ignorant count their tickets and reckon their dues on their fingers, is a trait characteristic of all, and, having received the few shillings, which mean a luxurious Sunday, they trudge off to town, chattering volubly, whether any one listens or not.

But many can not resist the rollicking music back of the paying booth. Three sable musicians form the orchestra, and from a bass viol, fiddle and fife they extract melody that, with all its short-coming, would make a deacon wish to dance. Any one, white or black, can purchase the privilege of keeping step to the music for two cents, or one strawberry ticket. Business was superb, and every shade of color and character was represented. In the vernacular of the farm, the mulatto girls are called "strawberry blondes," and one that would have attracted attention anywhere was led out by a droll, full-blooded negro, who would

have made the fortune of a minstrel troupe. She was tall and willowy. A profusion of dark hair curled about an oval face, not too dark to prevent a faint color of the strawberry from glowing in her cheeks. She wore neither hat nor shoes, but was as unembarrassed, apparently, in her one close-fitting garment, as could be any ballroom belle dressed in the latest mode. Another blonde, who sported torn slippers and white stockings, was in danger of being spoiled by much attention. As a rule, however, bare feet were nothing against a "lady" in the estimation of the young men. At any rate, all who could spare a berry ticket speedily found a partner, and, as we rode away from the farm, the last sounds were those of music and merriment, and our last glimpse was of the throng of dancers on the green.

The confused uproar and rush of business around the Old Dominion steamship made a marked contrast. To the ample wharves every species of vehicle had been coming all day, while all kinds of craft, from a skiff to a large two-masted schooner, waiting their turn to discharge their freight of berry crates and garden produce, reached half across the Elizabeth river. The rumble of the trucks was almost like the roar of thunder, as scores of negroes hustled crates, barrels and boxes aboard. Most of the time they were on a good round trot, and one had to pick his way with care; for, apparently, the truck was as thoughtful as the trundler.

As the long twilight fades utterly into night, the last crate is aboard. The dusky forms of the stevedores are seen in an old pontoon-shaped boat on their way to Portsmouth, but their outlines, and the melody of their rude song, are soon lost in the distance. The ship, that has become like a huge section of Washington Market, casts off her lines, and away we steam, diffusing on the night air the fragrance of a thousand acres, more or less, of strawberries.

It was late in the night that followed the next day before we reached New York, but on the great covered wharf, to

which was given a noonday glare by electric light, there was no suggestion of the darkness and rain without. Various numbers, prominent on the sides of the building, indicated the lines of transit and the commission houses to which the immense, indiscriminate cargo was assigned. With a heavy jar and rumble that would not cease till the ship was empty, a throng of white laborers wheel each package to its proper place. Mr. Young's crates soon grew into what seemed, in the distance, a good-sized mound. The number above them stood for Eldridge & Carpenter, West Washington Market. Thither we followed them the next morning, but found that the most of them had already been scattered throughout the city, and realized that the berries we had seen a few hours before on the strawberry farm were even then on uptown breakfast-tables.

CHAPTER XVII

FORCING STRAWBERRIES UNDER GLASS

TRAINED gardeners need no instruction from me on this topic. There may be those, however, who have never given the subject attention, and who would be glad to learn some of the first principles of success in forcing this fruit for market; while a still larger number, having small conservatories and warm south windows, would be pleased to see a few strawberries blossoming and ripening, as an earnest of the coming June. There are no greater difficulties in the way than in having flowers, for it is merely a question of doing the right thing at the right time. I do not believe in a system of minute, arbitrary directions, so much as in the clear statement of a few general principles that will suggest what ought to be done. The strawberry plant has the same character indoors as out, and this fact alone, in view of what has been written, should suggest moisture, coolness, light, and air. I shall endeavor to present, however, each successive step.

First, prepare a compost of thoroughly rotted sods and the cleanings of the cow-stable, in the proportion of three parts sod-mould to one of manure. In the place of sods, decayed leaves, muck, sweetened by a year's exposure to air and frost, or any good, rich loam will answer. With this compost, made fine and clean by passing it through a coarse sieve, fill in June, and not later than July, as many three-inch pots as you desire; then sink them to their rims along the sides of the rows from which you propose to obtain winter-bearing plants. Varieties best adapted for forcing

are those of a low, stocky growth, bearing perfect flowers and sweet or high-flavored berries. I should say the Triomphe de Gand was the best, and I observe that it and the La Constante, which it closely resembles, are highly recommended abroad. The bush Alpines are said to do finely, and I should think the Black Defiance would answer well. Mr. Henderson speaks highly of the Champion, which, however, must be grown with a perfect-flowered kind, since it is a pistillate. From the parent row, guide the first runners so that they will take root in the pots. Let each runner form but a single, strong plant, which it will do in about two weeks, filling the pot with roots. Then these plants, with their accompanying balls of earth interlaced with roots, are ready to be shifted into pots of from six to eight inches in diameter, which also should be filled with the compost already described.

These larger pots should have three or four pieces of broken pottery in the bottom for drainage. One plant to each pot is sufficient, and the soil should be pressed firmly about the roots. The methods of growers now differ somewhat, but all agree in seeking to promote a continuous and healthy growth. It may be necessary to place the pots in a half-shady position for a few days, till the effects of shifting are over, and the roots have taken hold of the new soil. Then they should stand in an open, airy position, close together, where they can receive daily attention. Some recommend that they stand on boards, flagging, or bricks, or a layer of coal ashes, since earth-worms are thus kept out; others sink them in cold frames, where they can be protected somewhat from excessive heat and drenching storms; while others, still, sink the pots in the open ground, where it is convenient to care for and water them. It is obvious that moisture must be steadily and continuously maintained, and the plants be made to do their best until about the first of October. After this, they should be watered very sparingly—barely kept moist—since it is now our aim to ripen the foliage and roots and induce a season

of rest. At the same time, they should not be permitted to dry out. About the first of November, an old hot-bed pit can be filled with dry leaves and the pots plunged in them, close together, up to their rims, and, as the season grows colder, the tops can be covered, so as to prevent the earth in the pots from freezing. The top of the pit can be covered with boards to keep out the wet, but not so tightly as to exclude the air. Our aim is to keep the plants dormant, and yet a little above freezing, and barely moist enough to prevent the slightest shrivelling. Since it requires from ten to fourteen weeks to mature the fruit under glass, it would be well to subject some of the plants to heat early in October, so as to have ripe berries at the holidays. They can thereafter be taken from the storage place every two or three weeks, so as to secure a succession. By this course, also, if a mishap befalls one lot of plants, there still remain several chances for winter fruit.

In the forcing process, follow nature. The plants do not start suddenly in spring, but gradually awaken into life. The weather, also, is comparatively cool when they are blossoming. If these hints are not taken in the greenhouse, there may be much promise but little fruit. If the heat is turned on too rapidly when the plants begin to bloom, the calyx and corolla will probably develop properly, but the stamens will be destitute of pollen, while the pistils, the most complicated part of the flower, and that which requires the longest time for perfect formation, become "a mere tuft of abortions, incapable of quickening, and shrivelling into pitch-black threads as soon as fully in contact with the air." Let the conditions within-doors accord as far as possible with those under the open sky. The roots require coolness, continuous and evenly maintained moisture. One check from over-dryness may cause serious and lasting injury. The foliage needs air and light in abundance. Therefore the pots should be on shelves close to the glass; otherwise the leaf and fruit stalks will be drawn and spindling. If the pot can be shaded while

the plant is in full light, all the better. When first introduced, the temperature should not exceed 45° or 50°. Air must be freely admitted at all times, though much less will suffice, of course, in cold than in warm weather. Watch the foliage, and if it begins to grow long and without substance, give more air and less heat. An average of 55° to 70° by day may be allowed, and from 45° to 50° by night.

When the flower buds begin to open, the forcing must be conducted more slowly and evenly, so as to give the delicate organs time to perfect; but after the fruit is set, the heat can be increased till it occasionally reaches 75° at midday. After the fruit begins to color, give less water—barely sufficient to prevent any check in growth, and the fruit will be sweeter and ripen faster. The upper blossoms may be pinched off, so as to throw the whole strength of the plant into the lower berries. Keep off all runners; syringe the plants if infested with the red spider, and if the aphis appears, fumigate him with tobacco.

The plants that have fruited need not be thrown away as useless. If they are turned out of the pots into rich, moist soil, in April, and the runners are kept off all summer, they will make large, bushy stools, which will give a fine crop in autumn.

The amateur, with a small conservatory or south window, by approximating as far as poss ble to the conditions named, can achieve a fair success. I have had plants do moderately well by merely digging them from the beds late in the fall, with considerable rich earth clinging to their roots, and then potting with more rich soil, and forcing them at once. Of course, fine results cannot be expected from such careless work, but *some* strawberries can be raised with very little trouble. If one, however, wished to go into the business on a large and scientific scale, I would recommend a strawberry-house, designed by Mr. William Ingram, gardener at Belvoir Castle. A figure of the structure may be seen on page 74 in Mr. Fuller's valuable work, "The Small Fruit Culturist." On the same principles that we have

been describing, the ripening of strawberries can be hastened by the use of hot beds, cold frames, and ordinary sash.

During the Christmas holidays strawberries sell readily at from $4 to $8 per quart, and handsome fruit brings high prices till March; but the profit of raising them under glass threatens to diminish in future years, since Florida berries begin to arrive freely even in February. There are those who now seem to be doing well in the business of forcing, if we may judge from the jealousy with which they guard the open secrets of their calling from their neighbors.

A rough and ready method of forcing is to dig up clumps of plants during a mild spell in winter or early spring, put them in boxes or pots of rich earth, and take them into the green-house. Considerable fruit is sometimes ripened in this way.

An English writer says: "We find forced strawberries mentioned as being served at an installation dinner, April 23d, 1667; but the idea had already occurred to the great Lord Bacon, who writes, 'As we have housed the exotics of hot countries, so we may house our natives to forward them, and thus have violets, strawberries, and pease all winter.' "

CHAPTER XVIII

ORIGINATING NEW VARIETIES—HYBRIDIZATION

THIS chapter introduces us to great diversities of opinion, and to still greater differences in experience; and I fear that I shall leave the subject as indefinite as I find it. The scientist best versed in botany and the laws of heredity can here find a field that would tax his best skill for a lifetime, and yet a child may amuse himself with raising new kinds; and it would not be impossible that, through some lucky combination of nature, the latter might produce a variety that would surpass the results of the learned man's labor. As in most other activities of life, however, the probabilities are on the side of skill and continuous effort.

We have already shown that all the seeds of the *F. Virginiana* and *F. Chilensis may* produce a new variety. These seedlings often closely resemble the parent or parents, and sometimes are practically identical with one of them; more often they present distinct differences. It is wholly impossible to predict the character of seedlings as they usually are produced. If we could obtain pure specimens of the two great species, and cross them, the element of chance would not enter into the result so largely as must be the case when seed is gathered in our gardens. The pedigrees of but few varieties are known, and in many instances the two great races are so mingled that we can only guess which element predominates, by the behavior and appearance of the plants. The kinds with which we start are hybrids,

and, as Mr. A. S. Fuller sagaciously remarks, "Hybridizing, or crossing hybrids, is only mixing together two compounds, the exact proportions of neither being known." Therefore, the inevitable element of chance. Disagreeable traits and shiftless ways of strawberry grandparents and great-grandparents may develop themselves in a seedling produced by the union of two first-class varieties. At the same time it is possible that fine ancestral qualities may also assert themselves. The chance seedling, which comes up in a garden where good varieties have been raised, may prove a prize. The Forest Rose was found growing in a vineyard. If we propose to raise seedlings, however, we will, of course, select seeds from the best fruit of fine varieties, even in our first and most rudimental efforts. Before making any serious or prolonged attempt to originate new varieties, it would be well to familiarize ourselves with certain principles, and gather experience from the successes and failures of others. We have seen that the *F. Virginiana* is the native species of the eastern section of our continent, and that its vigor and hardiness best adapt it to our extremes of climate. It were best to start, therefore, with the most vigorous strains and varieties of this hardy species. It is true that fine results can be obtained from crossing varieties of the *F. Chilensis* with our native species—the President Wilder proves this—but few of such products are adapted to the country at large, and they will be almost sure to falter on light soils. We will achieve our best success in developing our native species. By observation, careful reading of the horticultural journals, and by correspondence, the propagator can learn what varieties show vigor and productiveness throughout a wide range of country, and in great diversities of soil and climate. These sturdy kinds, that seem bent on doing well everywhere, should be the robust forefathers of the strawberries of the future. Starting with these, we are already well on the way toward the excellence we hope to attain. The pith of our difficulty now is to make any further advance. How

can we surpass that superb group of berries that prove their excellence year after year?

As Mr. Durand well puts it, new varieties, to be of value, should produce berries that "measure from four to eight inches in circumference, of good form, color and flavor; very large specimens are not expected to be perfect in form, yet those of medium size should always be. The calyx should never be imbedded in the flesh, which should be sufficiently firm to carry well, and withstand all changes of our variable climate. The texture should be fine, flesh rich, with a moderate amount of acid—no more than just sufficient to make it palatable with sugar as a table berry. The plant should be hardy, vigorous, large, and strong; of great endurance as to climatic change, and able to stand any amount of manure of the right kind. It should be a prolific bearer, with stalks of sufficient length to keep the fruit out of the dirt, and bear its berries of nearly uniform size to the end. Any serious departure from such necessary qualities would be fatal to any new variety."

What is the use of spending time on varieties that do not possess these good qualities, or many of them, so pre-eminently that they supersede those already in our gardens? Shall I root out the Charles Downing, Seth Boyden, and Monarch, and replace them with inferior kinds because they are new? That is what we have been doing too extensively. But if, in very truth, varieties can be originated that do surpass the best we now have, then both common-sense and self-interest should lead to their general cultivation. I believe that honest and intelligent effort can secure a continued advance in excellence which will probably be slow, but may be sure.

The public, however, will suffer many disappointments, and every year will buy thousands of some extravagantly praised and high-priced new variety, in hope of obtaining the ideal strawberry; and they so often get a good thing among the blanks that they seem disposed to continue in-

definitely this mild form of speculation. In the final result merit asserts itself, and there is a survival of the fittest. The process of winnowing the wheat from the chaff is a costly one to many, however. I have paid hundreds of dollars for varieties that I now regard as little better than weeds. From thorough knowledge of the best kinds already in cultivation, the propagator should not impose any second-rate kind on the public. And yet the public, or the law which the public sustains, renders this duty difficult. If a man invents a peculiar nutmeg-grater, his patent protects him; but if he discovers, or originates, a fruit that enriches the world, any one who can get it, by fair means or foul, may propagate and sell to all. To reap any advantages, the originator must put his seedling, which may have cost him years of effort, into the market before it is fully and widely tested. If he sends it for trial to other localities, there is much danger of its falling into improper hands. The variety may do splendidly in its native garden, and yet not be adapted to general cultivation. This fact, which might have been learned by trial throughout the country before being sent out, if there was protective law, is learned afterward, to the cost of the majority who buy. In view of the above considerations, it is doubtful whether the pecuniary reward will often repay for the time, trouble, and expense which is usually required to produce a variety worthy of general introduction. Other motives than money must actuate. As Mr. Durand once said, when so perplexed by the difficulties and complications of his labor, and so disheartened by the results that he was inclined to throw down the burden, "There is a fascination that binds me still." In other words, he was engaged in one of the divinest forms of alchemy.

Having procured the vigorous stock from which we hope to obtain still stronger and more productive varieties, we may go to work several ways. We may plant our choice varieties in close proximity, and let the bees and summer gales do the hybridizing. It will be remembered that the

organs of procreation in the perfect strawberry blossom are the pistils on the convex receptacle and the encircling stamens. The anthers of the latter produce a golden powder, so light that it will float on a summer breeze, and so fine that insects dust themselves with it and carry it long distances. When this dust, which is called pollen, comes in contact with the stigma of a pistil, it imparts the power of development both to the seed and that which sustains it—the receptacle which is eventually transformed into the juicy pulp. If the pistils are not fertilized, there will be no strawberries, as well as no seeds. Perfect-flowering varieties, therefore, are self-fertilizing. There are stamens and pistils in the same flower, and the pollen from the former impregnates the latter. In view of this fact, the probabilities are all against success in obtaining an improved variety. While the pollen *may* pass from one perfect-flowering kind to another, and produce a seed which will give a new combination, the chances of self-fertilization, and that, in consequence, the seeds will produce degenerate and somewhat varying counterparts of the parent, are so great that it is a waste of time to plant them. There is little to be hoped, therefore, from the seed of perfect-flowering kinds left to nature's influences.

In this country, we have pistillate varieties, or those that are wholly destitute of stamens. Mr. Fuller says that, for some reason, they do not originate abroad. It is obvious that, with these pistillates, we can attain a direct cross with some staminate or perfect-flowering variety; but if our pistillates grow openly in the garden, near several staminates, the seeds sown may have been fertilized by the poorest of them, or by pollen from wild strawberries, brought by the wind or insects. It is all haphazard work, and we can only guess at the parentage of the seedlings. There is no skilful combination of good qualities, such as the stock farmer makes when he mingles good blood. Gathering the seed, therefore, in our gardens, even under the most favorable auspices, is the veriest game of hazard, with

nearly all the chances against us; and yet superb varieties are occasionally procured in this way. Indeed, as we have seen, they sometimes come up themselves, and assert their merit wholly unaided. By such methods, however, the propagator has not one chance in thousands, as much experience shows.

We are, therefore, led to isolate our plants, and to seek intelligently and definitely to unite the good qualities of two distinct varieties. If they have no pistillate plants abroad, they must remove all the stamens from some perfect flower before they are sufficiently developed to shed their pollen, and then fertilize the pistils with the stamens of the other variety whose qualities they wish to enter into the combination. There is no need of our doing this, for it involves much trouble and care at best, and then we are always haunted by the fear that the stamens were not removed in time, or so completely as to prevent self-fertilization. With such pistillate varieties as the Golden Defiance, Champion, Springdale, and Crescent, we have as robust motherhood as we require.

In order to present to the reader the most approved systems of hybridization, I will give the methods of two gentlemen who are among the best known in relation to this subject.

The late Mr. Seth Boyden won world-wide celebrity by his success, and the berry named after him will perpetuate his memory for many years to come. When grown under the proper conditions, it presents a type of excellence still unsurpassed.

Mr. Boyden's neighbor, Mr. Ogden Brown, of Hilton, N. J., writes to me as follows:

"My method of raising seedlings is the one practiced by Mr. Boyden. In August I set the plants from which I wish to secure new combinations in a plot of ground the size of my glass frame, and in early spring set the frame over them, so that the plants may blossom before any others. Thus, no

mixture from the pollen of outside plants can take place, for none are in bloom save those in the frame. The plants within the frame are two or three pistillate plants, all of one good variety like the Champion; and three or four superior, perfect-flowering kinds, any one of which, I think, will make a good combination with the pistillate variety. The seeds from the pistillate only are used, and when the fruit is ripened, these seeds are slightly dried and placed between two pieces of ice for about two weeks. I then put them in pure sand, wrapped up in a wet rag, and keep them sufficiently near the fire to preserve constant warmth until the germs are ready to burst forth. I then sow the seeds in a bed of finely riddled rich earth, and cover with boards about six inches from the soil. This is to prevent the sun from drying the ground. Plants thus raised will be sufficiently large to set in the fruiting-bed in September. In the fifteen years that I was acquainted with Mr. Boyden, I never knew him to fail in raising fruit from these plants the following summer. I do not know that Mr. Boyden's method has been improved upon."

Mr. J. M. Merrick, Jr., recommends this same isolation of the pistillate plant under glass.

It should be distinctly understood that while several perfect-flowering plants may be placed under the sash with a pistillate, the pollen of only one of these can fertilize a pistil. Mixing pollen from different kinds will never produce in a seedling the qualities of three or more varieties. The seedling is the product of two kinds only. Inclosing the plants in a frame ensures that all the pistils are fertilized by one or the other of the perfect-flowered varieties that are so fine as to promise a better combination of excellence than yet exists. The appearance of the seedling will probably show which of the kinds formed the combination, but often there would be uncertainty on this point, I think.

Mr. E. W. Durand, who sent out the Black Defiance,

Great American, Beauty, Pioneer, and several others, claims that the "true method is to propagate by pairs, each parent possessing certain distinctive features." "My course," he writes, in a paper read before the N. J. State Horticultural Society, "is to select my pistillates after years of trial, subject them to severe tests, and place alongside of each such a staminate as I think will harmonize and produce a certain desired effect. Another pistillate plant, of the same variety, is placed far away from the last, with a different staminate, and so on, till I exhaust the staminates or perfect-flowering kinds that I wish to test with that pistillate variety. Of late years, I have used but two or three kinds of pistillate plants, and they are a combination of excellence. I never show them to my most intimate friends, and the public know nothing about them. The years of trial and experiment necessary to produce such plants must necessarily discourage a beginner; yet it is the only course that will lead to success."

I think that Mr. Durand takes too gloomy a view of the subject, and I can see no reason why any one starting with such pistillates as the Golden Defiance, Champion, and others, may not originate a variety superior to any now in existence. At the same time, I must caution against over-sanguine hopes. Mr. Durand states the interesting fact that he generally produces 3,000 new varieties annually, and including the year 1876, he had already originated about 50,000 seedlings. While some of these have already secured great celebrity, like the Great American, I do not know of one that promises to maintain a continued and national popularity. I regard his old Black Defiance and the later Pioneer as his best seedlings, so far as I have seen them. Very many others do not have even his success. We may have to experiment for years before we obtain a seedling worth preserving; nevertheless, in the heart of each propagator lurks the hope that he may draw the prize of prizes.

I will close this chapter with a few simple and practical

suggestions. It is not necessary to place the seeds in ice. They may be sown in July, in rich soil, rendered fine and mellow, and in a half-shady position; and the surface should be kept moist by watering, and a sprinkling of a little very fine compost, that will prevent the ground from baking. Some of the seeds will germinate that season, more will come up the following spring. Or, they may be started in a cold frame under glass, and hastened in their growth so that good-sized plants are ready for the fruiting-bed by September. Mr. Durand plants his seed in the spring, and the seedlings bear the following year. The plants should be set eighteen inches apart each way in the fruiting-bed. When they blossom, note and mark all the pistillates as such. Those that grow feebly, and whose foliage scalds or burns in the sun, root out at once. The Spartan law of death to the feeble and deformed should be rigorously enforced in the fruit garden. The first year of fruiting will satisfy you that the majority of seedlings are to be thrown away. Those that give special promise should be lifted with a large ball of earth, and planted where they may be kept pure from mixture, and given further trial. Remember that a seedling may do better the first year than ever after, and that only a continued and varied trial can prove its worth. All runners should be kept off, unless the ground is infested with grubs, and there is danger of losing a promising variety of which we have but one specimen. If so fortunate as to raise superior seedlings, test them side by side, and under the same conditions with the best kinds in existence, before calling to them public attention. Try them, also, in light and heavy soils; and, if possible, send them to trusted friends who will subject them to varied climates in widely separated localities. If, however, you find them vigorous and productive on the light, poor soil of your own place, you may hope much for them elsewhere. No berry will be generally popular that requires much petting. I only state this as a fact. In my opinion, some varieties are

so superb in size and flavor that they deserve high culture, and well repay it.

It is a question whether, except for the purposes of propagation, pistillate varieties should be preserved and sent out. Mr. Fuller and others take ground against them, and their views are entitled to great respect, but with such kinds as the Golden Defiance and Champion in my garden, I am not prepared to condemn them. One objection urged against them is that many purchase a single variety, and, should it prove a pistillate, they would have no fruit. They would not deserve any, if they gave the subject so little attention. Every fruit catalogue states which are pistillates, and their need of a perfect-flowering kind near them. Again, it is urged that this necessary proximity of two kinds leads to mixtures. It need not, and, with the plant grower, can only result from gross carelessness. The different beds may be yards apart. In order to secure thorough fertilization, it is not at all necessary to plant so near that the two kinds can run together. In a large field of pistillates, every tenth row should be of a staminate, blossoming at the same time with the pistillate. The Kentucky seedling is a first-class staminate, but it should not be used to fertilize the Crescent, since the latter would almost be out of bloom before the former began to blossom. Plant early pistillates with early staminates, and late with late.

Many ask me: "Do strawberries mix by being planted near each other?" They mix only by running together, so that you can scarcely distinguish the two kinds; but a Wilson plant will produce Wilson runners to the end of time; and were one plant surrounded by a million other varieties, it would still maintain the Wilson characteristics. It is through the seeds, and seeds only, that one variety has any appreciable effect upon another. Many have confused ideas on this point.

A man brought to the Centennial Exhibition, at Philadelphia, a pot of strawberries that attracted great attention, for the fruit was magnificent. I suggested to him that it

resembled the Jucunda, and he said that it was a cross between that berry and the Seth Boyden. This was a combination that promised so well that I went twenty miles, on a very hot day, to see his bed, and found that the crossing was simply the interlacing of the runners of the two distinct varieties, and that I could tell the intermingled Jucunda and Boyden plants apart at a glance. Such crossing would make no marked change in varieties if continued for centuries.

The enemies and diseases of the strawberry will be grouped in a general chapter on these subjects.

CHAPTER XIX

RASPBERRIES—SPECIES, HISTORY, PROPAGATION, ETC.

I HAVE given the greater part of this volume to the subject of strawberries, not only because it is the most popular fruit, but also for the reason that the principles of thorough preparation of the soil, drainage, culture, etc., apply equally to the other small fruits. Those who have followed me carefully thus far can soon master the conditions of success which apply to the fruits still to be treated. I shall now consider a fruit which is only second in value, and, by many, even preferred to all the others.

Like the strawberry, the raspberry is well connected, since it, also, belongs to the Rose family. It has a perennial root, producing biennial woody stems that reach a height of from three to six feet. Varieties, however, differ greatly in this respect. Usually, the stems or canes do not bear until the second year, and that season ends their life, their place being taken by a new growth from the root. The flowers are white or red, very unobtrusive, and rich in sweetness. The discriminating bees forsake most other flowers while the raspberry blossoms last. The pistils on the convex receptacle mature into a collection of small drupes, or stone fruits, of the same character as the cherry, plum, etc., and the seeds within the drupes are miniature pits. These drupes adhere together, forming round or conical caps, which will drop from the receptable when overripe. I have seen the ground covered with the fruit of certain varieties, when picking has been delayed.

All peoples seem to have had a feeling sense of the

spines, or thorns of this plant, as may be gathered from its name in different languages; the Italian term is *Raspo*, the Scotch *Raspis*, and the German *Kratsberre*, or Scratchberry.

The Greeks traced the raspberry to Mount Ida, and the original bush may have grown in the shadowy glade where the "Shepherd Alexandre," *alias* Paris, son of Priam, King of Troy, gave his fateful decision in favor of Venus. Juno and Minerva undoubtedly beguiled the time, while the favored goddess presented her claims, by eating the fruit, and perhaps enhanced their competitive beauty by touching their cheeks with an occasional berry. At any rate, the raspberry of the ancients is *Rubus Idæus*.

The elder Pliny, who wrote not far from 45 A.D., states that the Greeks distinguished the raspberry bramble by the term "*Idæa*," and, like so many other Grecian ideas, it has found increasing favor ever since. Mr. A. S. Fuller, one of the best-read authorities on these subjects, writes that "Paladius, a Roman agricultural author who flourished in the fourth century, mentions the raspberry as one of the cultivated fruits of his time." It thus appears that it was promoted to the garden long before the strawberry was so honored.

While it is true that the raspberry in various forms is found wild throughout the continent, and that the ancient gardeners in most instances obtained their supply of plants in the adjacent fields or forests, the late Mr. A. J. Downing is of the opinion that the large-fruited varieties are descendants of the "Mount Ida Bramble," and from that locality were introduced into the gardens of southern Europe.

In America, two well-known and distinct species are enriching our gardens and gracing our tables with their healthful fruit. We will first name *R. Strigosus*, or the wild red raspberry, almost as dear to our memory as the wild strawberry. It grows best along the edge of woodlands and in half-shadowy places that seem equally adapted to lovers' rambles.

Nature, too, in a kindly mood, seems to have scattered

the seeds of this fruit along the roadside, thus fringing the highway in dusty, hot July with ambrosial food.

Professor Gray thus describes the native red species: "*R. Strigosus*, Wild Red R. Common, especially North; from two to three feet high; the upright stems, stalks, etc., beset with copious bristles, and some of them becoming weak prickles, also glandular; leaflets oblong-ovate, pointed, cut-serrate, white-downy beneath, the lateral ones (either one or two pairs) not stalked; petals as long as the sepals; fruit light-red, tender and watery, but high flavored, ripening all summer."

The second great American species, *R. Occidentalis*, will be described hereafter. Since this book is not designed to teach botany, I shall not refer to the other species—*R. Triflorus*, *R. Odoratus*, *R. Nutkanno*, etc.—which are of no practical value, and, for the present, will confine myself to the propagation and cultivation of *R. Idæus* and *R. Strigosus*, and their seedlings.

PROPAGATION

Usually, varieties of these two species throw up suckers from the roots in sufficient abundance for all practical purposes, and these young canes from between the hills or rows are, in most instances, the plants of commerce, and the means of extending our plantations. But where a variety is scarce, or the purpose is to increase it rapidly, we can dig out the many interlacing roots that fill the soil between the hills, cut them into two-inch pieces, and each may be developed within a year into a good plant. Fall is the best season for making root cuttings, and it can be continued as late as the frost permits. My method is to store the roots in a cellar, and cut them from time to time, after out-of-door work is over. I have holes bored in the bottom of a box to ensure drainage, spread over it two inches of moist (not wet) earth, then an inch layer of the root cuttings, a thin layer of earth again, then cuttings until the box is full. If the cellar is cool and free from frost, the cuttings may be kept

there until spring; or the boxes containing them can be buried so deeply on a dry knoll in a garden as to be below frost. Leaves piled above them ensure safety. Make sure that the boxes are buried where no water can collect either on or beneath the surface. Before new roots can be made by a cutting, a whitish excrescence appears at both its ends, called the callus, and from this the rootlets start out. This essential process goes on throughout the winter, and therefore the advantage of making cuttings in the fall. Occasionally, in the fall, we may obtain a variety that we are anxious to increase, in which case some of the roots may be taken off for cuttings before setting out the plants.

These little root-slips may be sown, as one would sow peas, early in the spring as soon as the ground is dry enough to work. A plot of rich, moist land should be chosen, and the soil made mellow and fine, as if for seed; drills should then be opened eighteen inches apart, two inches deep on heavy land, and three inches deep on light. The cuttings must now be dropped three inches from each other in the little furrows, the ground levelled over them and firmed, which is best done by walking on a board laid on the covered drill, or else by the use of a garden roller. If the entire cutting-bed were well sprinkled with fine compost, and then covered so lightly—from one quarter to half an inch—with a mulch of straw that the shoots could come through it without hindrance, scarcely a cutting would fail. Unfailing moisture, without wetness, is what a cutting requires.

Roots may be divided into half-inch bits, if forced under glass, and in this way nurserymen often speedily provide themselves with large stocks of very scarce varieties. The cuttings are placed in boxes of sand until the callus forms, and little buds appear on the surface of the roots, for which processes about five weeks are required. They are then sown in shallow boxes containing about three inches of soil, formed of equal parts of sand and decayed leaves, and subjected to the heat of the green-house. When they have

formed plants from three to five inches high, they may be potted, if very valuable; or, if the weather is warm enough, they can be transplanted at once into the open nursery-bed, as one would a strawberry plant. I have set out many thousands in this way, only aiming to keep a little earth clinging to the roots as I took them from the shallow box. Plants grown from cuttings are usually regarded as the best; but if a sucker plant is taken up with fibrous roots, I should regard it as equally good.

If we wish to try our fortune in originating new varieties, we gather the largest and earliest berries, dry them, and plant the seeds the following spring; or we may separate the seeds from the pulp by expressing it and mixing them with dry sand, until they are in a condition to be sown evenly in a sheltered place at once. As with strawberries, they should be raked lightly into moist, rich soil, the surface of which should not be allowed to become dry and hard. The probabilities are that they will germinate early in the spring and produce canes strong enough to bear the second year. If the seed is from a kind that can not endure frost, the young plant should receive thorough winter protection. There is nothing better than a covering of earth. In the spring of the second year, cut the young plant down to the ground, and it will send up a strong, vigorous cane, whose appearance and fruit will give a fair suggestion of its value the third year. Do not be sure of a prize, even though the berries are superb and the new variety starts off most vigorously. Let me give a bit of experience. In a fine old garden, located in the centre of the city of Newburgh, N. Y., my attention was attracted by the fruit of a raspberry bush whose roots were so interlaced with those of a grapevine that they could not be separated. It scarcely seemed to have a fair chance to live at all, and yet it was loaded with the largest and most delicious red raspberries that I had then ever seen. It was evidently a chance, and very distinct seedling. I obtained from Mr. T. H. Roe, the proprietor of the garden, permission to propagate the

variety, and in the autumn removed a number of the canes to my place at Cornwall. My first object was to learn whether it was hardy, and therefore not the slightest protection was given the canes at Newburgh, nor even to those removed to my own place, some of which were left four feet high for the sake of this test. The winter that followed was one of the severest known; the mercury sank to 30° below zero, but not a plant at either locality was injured; and in the old garden a cane fourteen feet long, that rested on the grape-arbor, was alive to the tip, and in July was loaded with the most beautiful fruit I had ever seen. It was uninjured by the test of another winter, and all who saw and tasted the fruit were enthusiastic in its praise. The Massachusetts Horticultural Society awarded it their first premium, and Mr. Charles Downing said it was the finest red raspberry he had ever seen. The veteran horticulturist, Mr. Wm. Parry, who has had between forty and fifty years of experience in small fruits, visited my place that summer. The bushes he saw had never received any protection, and had already been three weeks in bearing, but they were still full of fruit. After picking several berries that measured plump three inches in circumference, he said, quietly, "Put me down for 500 plants." In no other way could he have stated his favorable opinion more emphatically. It was as delicious as it was large and beautiful, and surely I was reasonable in expecting for it a brilliant future. In my faith I planted it largely myself, expecting to make it my main dependence as a market berry. But in August of that year many of the canes lost their foliage. Those that thus suffered were not entirely hardy the following winter. It was eventually made clear that it belonged to the tender *Rubus Idæus* class, and, therefore, was not adapted to general cultivation, especially on light soils, and under sunny skies. As I have shown, its start was so full of vigor and promise that it won the favor and confidence of the horticultural veterans; but it suddenly manifested lack of stamina and sturdy persistence in well-doing. And this

is just the trouble which every experienced propagator dreads. Only after years of test and trial in many localities can he be assured that his seedling may become a standard variety.

If this chance seedling, the Pride of the Hudson, is given a moist soil in some half-shady location, it will yield fruit that will delight the amateur's heart, but, like Brinkle's Orange, which it resembles in flavor, only amateurs will give it the petting it requires.

As suggested when treating the strawberry, so in seeking to originate new varieties of raspberries, our aim should be to develop our hardy native species, the *R. Strigosus*, and if we employ the *R. Idæus* class for parentage on one side, seek its most vigorous representatives, such as the Belle de Fontenay and Franconia.

CHOICE OF LAND—ITS PREPARATION—PLANTING

All that has been said about the thorough preparation of the soil for strawberries, by drainage, deep plowing, trenching, etc., applies to raspberries, but differences should be noted in respect to fertilizers. Land can scarcely be made too rich for any variety of strawberries, but certain strong-growing raspberries, like the Cuthbert, Herstine, and Turner, should not be over-fertilized. Some kinds demand good, clean culture, rather than a richness that would cause too great a growth of cane and foliage. In contrast, the feebler growing kinds, like the Brandywine, and most of the foreign varieties, require abundance of manure. Muck, sweetened by lime and frost is one of the simplest and best; but anything will answer that is not too full of heat and ferment. Like the strawberry, the raspberry needs cool manures that have "staying" qualities. Unlike the former fruit, however, the raspberry does well in partial shade, such as that furnished by the northern side of a fence, hedge, etc., by a pear or even apple orchard, if the trees still permit wide intervals of open sky. The red varieties, especially those of the foreign type, much prefer moist,

heavy soils; but the black-caps do quite as well on light ground, if moisture can be maintained. The latter, also, can be grown further south than any other species; but below the latitude of New York, those containing foreign elements begin to fail rapidly, until, at last, a point is reached where even the most vigorous native red varieties refuse to live. If the climate, however, is tempered by

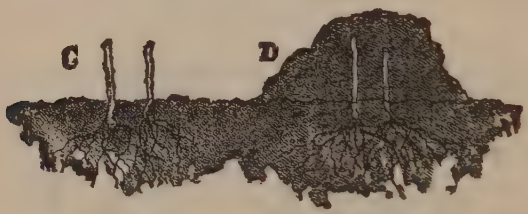
SPRING AND FALL PLANTS

height above the sea, as in the mountains of Georgia, they will thrive abundantly.

I prefer fall planting for raspberries, especially in southern latitudes, for these reasons: At the points where the roots branch (see Fig. A) are buds which make the future stems or canes. In the fall, these are dormant, small, and not easily broken off, as in Fig. B; but they start early in spring, and if planting is delayed, these become so long and brittle that the utmost care can scarcely save them. If rubbed off, the development of good bearing canes is often deferred a year, although the plants may live and fill

the ground with roots. The more growth a raspberry plant has made when set out in spring, the greater the probability that it will receive a check, from which it will never recover.

I have often planted in May and June, successfully, by taking up the young suckers when from six inches to a foot high, and setting them where they are to grow. Immediately on taking them up, I cut them back so that only one or two inches of the green cane is left, and thus the roots are not taxed to sustain wood and foliage beyond their power. This can often be done to advantage, when the plants are on one's own place, and in moist, cloudy weather. My preference, however, is to plant the latter part of October and through November, in well-prepared and enriched



WINTER PROTECTION OF NEWLY SET PLANTS

land. The holes are made quite deep and large, and the bottom filled with good surface soil. If possible, before planting, plow and cross-plow deeply, and have a subsoiler follow in each furrow. It should be remembered that we are preparing for a crop which may occupy the land for ten or fifteen years, and plants will suffer from every drought if set immediately on a hard subsoil. On heavy land, I set the plants one inch deeper than they were before; on light soils two or three inches deeper. I cut the canes off six inches above the surface (see Fig. C); for leaving long canes is often ruinous, and a plant is frequently two or three years in recovering from the strain of trying to produce fruit the first year. The whole strength of the roots should go toward producing bearing canes for the season following; and

to stimulate such growth, I throw directly on the hill one or two shovelfuls of finely rotted compost and then mound the earth over the hill until the cane is wholly covered (as in Fig. D). This prevents all injury from the winter's cold. When severe frosts are over, the mound is levelled down again. Under this system, I rarely lose plants, and usually find that double growth is made compared with those set *late* in spring. I have always succeeded well, however, in *early* spring planting; and well to the north, this is, perhaps, the safer season. With the exception of mounding the earth over the hill, plant in March or April as I have already directed.

CULTIVATION

In cultivation, keep the ground level; do not let it become banked up against the hills, as is often the case, especially with those tender varieties that are covered with earth every winter. Keep the surface clean and mellow by the use of the cultivator and hoe. With the exception of from four to six canes in the hill, treat all suckers as weeds, cutting them down while they are little, before they have sucked half the life out of the bearing hill. Put a shovelful or two of good compost—any fertilizer is better than none—around the hills or along the rows, late in the fall, and work it lightly in with a fork if there is time. The autumn and winter rains will carry it down to the roots, giving almost double vigor and fruitfulness the following season. If the top-dressing is neglected in the autumn, be sure to give it as early in the spring as possible, and work it down toward the roots. Bone-dust, ashes, poudrette, barnyard manure, and muck with lime can be used alternate years, so as to give variety of plant food, and a plantation thus sustained can be kept twenty years or more; but under the usual culture, vigor begins to fail after the eighth or tenth season. The first tendency of most varieties of newly set red raspberries is to sucker immoderately; but this gradually declines, even with the most rampant, and under good culture the fruiting qualities improve.

In dry weather the fork should not be used during the growing or bearing season. The turning down of a stratum of dry, hot soil next to the roots must cause a sudden check and injury from which only a soaking rain can bring full relief. But in moist weather, and periods preceding and following the blossoming and fruiting season, I have often used the fork to advantage, especially if there is a sod of short, succulent weeds to be turned under as a green crop. If the ground between the hills was stirred frequently with an iron garden-rake, the weeds would not have a chance to start. This is by far the best and cheapest way of maintaining our part in the unceasing conflict with vegetable evil. An Irish bull hits the truth exactly: the best way to fight weeds is to have none to fight; and raking the ground over on a sunny day, about once a week, destroys them when they are as yet but germinating seeds. At the same time it opens the pores of the earth, as a physiologist might express himself. Unfailing moisture is maintained, air, light, and heat are introduced to the roots in accordance with Nature's taste, and the whole strength of the mellow soil goes to produce only that which is useful. But this teaching is like the familiar and sound advice, "Form no bad habits." We do form them; the weeds do get the start of us; and therefore, as a practical fact, the old moral and physical struggle must go on until the end of time.

CHAPTER XX

RASPBERRIES—PRUNING—STAKING—MULCHING—WINTER PROTECTION, ETC.

USUALLY, there is no pruning either in the field or the garden beyond the cutting out of the old canes and the shortening in of the new growth. There is a difference of opinion as to whether the old canes should be cut out immediately after fruiting, or left to natural decay, and removed the following fall or spring. I prefer the former course. It certainly is neater, and I think I have seen increased growth in the young canes, for which more room is made, and to whose support the roots can give their whole strength. The new growth can make foliage fast enough to develop the roots; still, I have not experimented carefully, and so cannot speak accurately. We see summer pruning often advocated on paper, but I have rarely met it in practice. If carefully done at the proper season, however, much can be accomplished by it in the way of making strong, stocky plants, capable of standing alone—plants full of lateral branches, like little trees, that will be loaded with fruit. But this summer pinching back must be commenced early, while the new, succulent growth is under full headway, and continued through the busiest season, when strawberries are ripe and harvest is beginning. It should not be done after the cane has practically made its growth, or else the buds that ought to remain dormant until the following season are started into a late and feeble growth that does not ripen before the advent of early frosts. Few have time for pruning in May or June. If they have, let them try it by all means, especially on the black-cap species. It does not require so much time as it

does prompt action at the proper period of growth. In the garden, summer pinching can transform a raspberry bush into an ornamental shrub as beautiful as useful. It is much better adapted to the hardier varieties than to those that must be bent down and covered with earth. With the *R. Occidentalis* species, summer pinching would always pay well. The best I can do, usually, with the red varieties, is to prune in November and March; it should be done before the buds develop. Unless early fruit is wanted, I believe in cutting back heroically. Nature once gave me a very useful hint. One very cold winter, a row of Clarke raspberries was left unprotected. The canes were four or five feet high, but were killed down to the snow-level, or within eighteen inches of the ground; but from what was left uninjured, we had as many and far finer berries than were gathered from other rows where the canes had been left their full length and protected by a covering of earth. The fruit was later, however. I would remind careful observers of the raspeberry how often buds on canes that have been broken off or cut away back develop into long sprays, enormously fruitful of the largest berries. I have counted fifty, and even eighty, berries on a branch that had grown from a single bud within one or two feet of the ground. These lower buds often do not start at all when the canes are left their full, or nearly their full length. In the latter case the fruit ripens much earlier and more together; and since an early crop, though inferior in quality and quantity, may be more valuable than a late one, the fruit grower often objects to pruning. But in the garden, while the canes of some early kinds are left their full length, I would recommend that others, especially those of the later varieties, be cut back one-half. Even for market purposes I believe that the superb fruit resulting from such pruning would bring more money in most instances. At any rate, the season of bearing would be greatly prolonged.

Mulching on a large scale would not pay in most localities. In regions where salt hay, flags, etc., can be cut in

abundance, or where straw is so plenty as to be of little value, it no doubt could be applied profitably. On Staten Island I have seen large patches mulched with salt hay. The canes were unstaked, and many of them bent over on the clean hay with their burden of fruit. When there are no stakes or other support used, the berries certainly should be kept from contact with the soil. The chief advantage of the mulch, however, is in the preservation of moisture. When it is given freely, all the fruit perfects, and in a much longer succession. The weeds and suckers are kept down, and the patch has a neat appearance. Moreover, mulching prevents the foliage from burning, and enables the gardener to grow successfully the finer varieties further to the south and on light soils. In keeping down the weeds through the long summer, a mulch of leaves, straw, or any coarse litter, is often far less costly than would be the labor required.

Staking raspberries is undoubtedly the best, simplest, and cheapest method of supporting the canes of most varieties and in most localities. I agree with the view taken by Mr. A. S. Fuller. "Chestnut stakes," he writes, "five feet long and two or three inches in diameter, made from large trees, cost me less than two cents each, and my location is within twenty miles of New York City, where timber of all kinds commands a large price. I can not afford to grow raspberries without staking, because every stake will save on an average ten cents' worth of fruit, and, in many instances, three times that amount." Of course, split chestnut stakes look the neatest and last the longest; but a raspberry bush is not fastidious, and I utilize old bean-poles, limbs of trees—anything that keeps the canes from sprawling in the dirt with their delicate fruit. Thus, in many instances, the stakes will cost little more than a boy's labor in preparing them, and they can be of various lengths, according to the height of our canes. As they become too much decayed for further use, they make a cheery blaze on the hearth during the early autumn evenings. There are

stocky growing varieties, like the Cuthbert, Turner, Herstine and others, that by summer pruning or vigorous cutting back would be self-supporting, if not too much exposed to high winds. The question is a very practical one, and should be decided largely by experience and the grower's locality. There are fields and regions in which gales, and especially thunder-gusts, would prostrate into the dirt the stoutest bushes that could be formed by summer pruning, breaking down canes heavy with green and ripe fruit. In saving a penny stake, a bit of string, and the moment

a. Canes snugly tied. *b*. Canes improperly tied.

RIGHT AND WRONG WAYS OF TYING CANES

required for tying, one might be made to feel, after a July storm, that he had been too thrifty. As far as my experience and observation go, I would either stake *all* my bushes that stood separately and singly, or else would grow them in a loose, continuous, bushy row, and keep the fruit clean by some kind of mulch. Splashed, muddy berries are not fit either to eat or to sell.

In many localities, however, stakes are dispensed with. In the garden, wires, fastened to posts, are occasionally stretched along the rows, and the canes tied to these. The method in this section, however, is to insert stakes firmly in

the hill, by means of a pointed crowbar, and the canes are tied to them as early in spring as possible. Unless watched, the boys who do the tying persist in leaving the upper cords of the canes loose. These unsupported ends, when weighted with fruit and foliage, break, of course. The canes should be snugly tied their whole length.

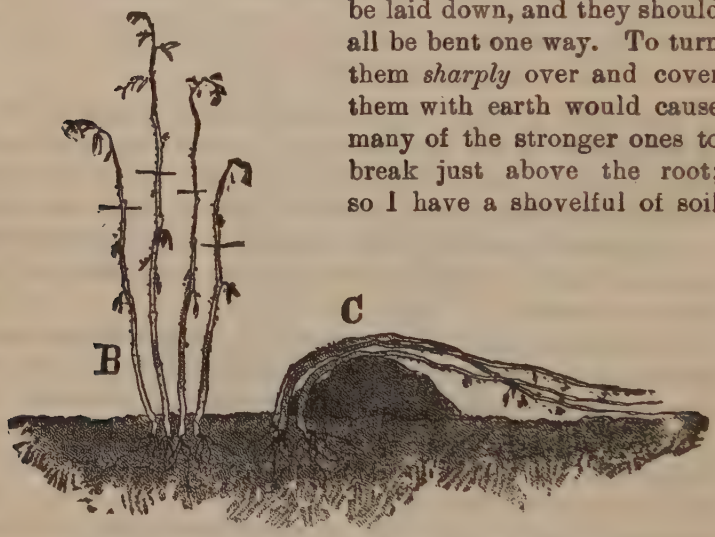
If bushes made stocky by summer pruning are supported, let the stake be inserted on the side opposite that from which heavy winds are expected.

WINTER PROTECTION—TAKING UP PLANTS FOR SPRING USE—STORING THEM

Nearly all foreign varieties and their seedlings need winter protection, or are the better for it, north of the latitude of New York City. Many of the hardier kinds, like the Herstine and Clarke, will usually survive if bent over and kept close to the earth by the weight of poles or a shovelful or two of soil; but all of the Antwerp class need to be entirely covered.

To many, this winter covering is a great bugbear, even when only a small patch in the garden is involved. There is a constant demand for "perfectly hardy" varieties. It should be remembered that many of the best kinds are not hardy at all, and that perhaps none are "perfectly hardy." The Turner has never been injured on my place, and the Cuthbert is rarely hurt; but occasionally they are partially killed, more by alternations of freezing and thawing than by steady cold. What are termed "open winters" are often the most destructive. I find that it pays to cover all those kinds that are liable to injury, and, as the varieties are described, this need will be distinctly stated. The difficulties of covering are chiefly imaginary, and it can be done by the acre at comparatively slight cost. The vast crops of the Hudson River Antwerp were raised from fields covered every fall. In the garden, I do not consider the labor worth naming in comparison with the advantages secured. Those who find time to carefully cover their cabbages and

gather turnips should not talk of the trouble of protecting a row of delicious Herstine raspberries. Still, Nature is very indulgent to the lazy, and has given us as fine a raspberry as the Cuthbert, which thus far, with but few exceptions, has endured our Northern winters. In November, I have the labor of covering performed in the following simple way: B is a hill with canes untrimmed. C, the canes have been shortened one-third—my rule in pruning. After trimming, the canes are ready to be laid down, and they should all be bent one way. To turn them *sharply* over and cover them with earth would cause many of the stronger ones to break just above the root; so I have a shovelful of soil



Pruning and Laying Down Canes

thrown on one side of the hill, as in Fig. C, and the canes bent over this little mound. They thus describe a curve, instead of lying at right angles on the surface, with a weight of earth upon them. A boy holds the cane down, while a man on either side of the row rapidly shovels the earth upon them. If the work is to be done on a large scale, one or two shovelfuls will pin the canes to the earth, and then, by throwing a furrow over them on both sides with a plow, the labor is soon accomplished. It will be necessary to fol-

low the plow with a shovel, and increase the covering here and there. In spring, as soon as hard frosts are over—the first week in April, in our latitude, usually—begin at the end of the row toward which the canes were bent, and with a fork throw and push the earth aside and gently lift the canes out of the soil, taking pains to level the ground thoroughly, and not leave it heaped up against the hills. This should not be done when the earth is wet and sticky. Keep off the ground at such times, unless the season is growing so late that there is danger of the canes decaying if not exposed to the air. The sooner they are staked and tied up after uncovering, the better.

For market or other purposes, we may wish a number of young plants, in which case there is much room for good sense in taking them up. Many lay hold upon the canes and pull so hastily that little save sticks comes out. A gardener wants fibrous roots rather than top; therefore, send the spade down under the roots and pry them out. Suckers and root-cutting plants can be dug in October, after the wood has fairly ripened, but be careful to leave no foliage on the canes that are taken up before the leaves fall, for they rapidly drain the vitality of the plants. It is best to cut the canes down to within a foot of the surface before digging. I prefer taking up all plants for sale or use in the latter part of October and November, and those not set out or disposed of are stored closely in trenches, with the roots a foot or more below the surface. By thus burying them deeply and by leaving on them a heavy covering of leaves, they are kept in a dormant state quite late in spring, and so can be handled without breaking off the buds which make the future canes. But, as we have already said, the earlier they are planted after the frost is out, the better.

CHAPTER XXI

RASPBERRIES—VARIETIES OF THE FOREIGN AND NATIVE SPECIES

THIS chapter will treat first of the imported kinds, which usually are more or less tender, and then, by way of contrast, of the hardy varieties of our native *R. Strigosus.*

I shall speak of those only that are now in general cultivation, naming a few, also, whose popularity in the past has been so great as to entitle them to mention.

As was true of strawberries, so also varieties of raspberries that won name and fame abroad were imported, and a few of them have adapted themselves so well to American soil and climate as to have become standards of excellence. Among the best-known of these formerly was the Red Antwerp of England. Few old-fashioned gardens were without it at one time, but it is fast giving way to newer and more popular varieties. The canes are vigorous, stocky, and tall; spines light-red, numerous, and rather strong. Winter protection is always needed. The berries are large and very obtuse, conical, dark-red, large-grained, and covered with a thick bloom, very juicy, and exceedingly soft—too much so for market purposes. They made a dainty dish for home use, however, and our grandmothers, when maidens, gathered them in the lengthening summer shadows.

The Hudson River Antwerp, the most celebrated foreign berry in America, is quite distinct from the above, although belonging to the same family. It is shorter and more slender in its growth, quite free from spines, and its canes are of a peculiar mouse-color. Its fruit is even larger, but firm,

decidedly conical, not very bright when fully ripe, and rather dry, but sweet and agreeable in flavor. Mr. Downing says that its origin is unknown, and that it was brought to this country by the late Mr. Briggs, of Poughkeepsie, N. Y. "As this gentleman was leaving England" (thus the story is told, Mr. Downing writes to me), "he visited a friend to say good-by, and solicited this new raspberry. Since he was leaving the country, and could cause no injury to the sale of plants, his friend gave him a few in parting, although three guineas had been refused for a single plant hitherto, in the careful effort to secure a large stock before putting the variety on the market." Its name suggests Belgium as its original home.

This Antwerp continues long in bearing, and the berries begin to ripen early. The good carrying qualities of the fruit, combined with great productiveness, made it at one time the most profitable market berry in this section; but its culture was chiefly confined to a narrow strip on the west shore of the Hudson, extending from Cornwall to Kingston. For some obscure reasons, it did not thrive in other localities, and now it appears to be failing fast in its favorite haunt. A disease called the "curl-leaf" is destroying some of the oldest and largest plantations, and the growers are looking about for hardier and more vigorous varieties. But in its palmy days, and even still, the Hudson River Antwerp was one of the great productions of the country, sending barges and steamers nightly to New York laden with ruby cones, whose aroma was often very distinct on the windward shore while the boats were passing. This enormous business had in part a chance and curious origin, and a very small beginning; while the celebrated variety itself, which eventually covered so many hundreds of acres on the west bank of the Hudson, may be traced back through two lines of ancestry. An English gardener, who probably obtained the plants from Mr. Briggs, gave some of them to a Mr. Samuel Barnes, who resided in Westchester County. From him, Mr. Thos. H. Burling, of New Rochelle, N. Y.,

secured an abundant supply for his home garden. Here its value was observed by Mr. Nathaniel Hallock, who transferred some of the canes to his place at Milton, N. Y. From his garden they spread over many fields besides his own.

In respect to the other line of ancestry of this historical berry, I am indebted for the following facts to Mr. W. C. Young, of Marlboro', N. Y.: Many years ago a bundle of raspberry plants was left at a meat-market in Poughkeepsie, and Mr. Watters, the proprietor of the place, kept them several days, expecting that they would be called for. As they remained upon his hands, he planted them in his garden, where, like genuine worth, they soon asserted their superiority. Mr. Edward Young, of Marlboro', a relative of Mr. Watters, received a present of a few roots, which supplied his family with the largest and most beautiful berries he had ever seen. Good propagates itself as well as evil if given a chance, and Mr. Young soon had far more fruit than was needed by his family, and he resolved to try the fortunes of his favorite in New York market. "For this purpose," his son writes, "my father procured imported fancy willow baskets, holding about one pint each, and carefully packed these in crates made for the purpose. This mode proved a success, both in carrying them securely and in making them very attractive. The putting up such a fine variety of fruit in this way gave it notoriety at once, and it brought at first as much as one dollar per quart. My father was so well satisfied with his experiment that he advised his sons, Alexander, Edward and myself, to extend the culture of this variety largely. We entered into the business, and, pursuing it with diligence, were well compensated. Our success made others desirous of engaging in it, and so it spread out into its large dimensions." Mr. Alexander Young estimates that in the year 1858 1,000,000 pint baskets, or about 14,700 bushels, were shipped from Marlboro'; but adds that "since 1860 it has decreased as fast. From present appearances, the variety must become extinct, and I fear will never have

its equal." Milton, Cornwall, Newburgh, and other points competed in the profitable industry, and now, with Marlboro', are replacing the failing variety with other kinds more vigorous in growth, but thus far inferior in quality.

That the great industry is not falling off is shown by the following statement, taken from the New York "Tribune" in the summer of 1779: "The village of Highland, opposite Poughkeepsie, runs a berry boat daily to New York, and the large night steamers are now taking out immense loads of raspberries from the river towns every evening, having at times nearly 2,000 bushels on board."

From as careful a computation as I have been able to make, through the courtesy of the officers of the large Kingston boats the "Baldwin" and "Cornell," I am led to believe that these two steamers unitedly carried to the city over twenty thousand bushels of berries that same year. The magnitude of this industry on the Hudson will be still better realized when it is remembered that several other freight boats divide this traffic with the Kingston steamers.

When we consider what a delicate and perishable fruit this is, it can be understood that gathering and packing it properly is no bagatelle. Sometimes you will find the fruit grower's family in the field, from the matron down to the little ones that cannot reach the highest berries. But the home force is wholly insufficient, and any one who will pick—man, woman or child—is employed. Therefore, drifting through the river towns during June and July, are found specimens almost as picturesque, if not so highly colored, as those we saw at Norfolk—poor whites from the back country and mountains; people from the cities on a humble "lark," who cannot afford to rusticate at a hotel; semi-tramps, who have not attained to the final stage of aristocratic idleness, wherein the offer of work is an insult which they resent by burning a barn. Rude shanties, with bunks, are fitted up to give all the shelter they require. Here they lead a gypsy life, quite as much to their taste

as camping in the Adirondacks, cooking and smoking through the June twilight, and as oblivious of the exquisite scenery about them as the onion-eating peasants of Italy; but when picking the fruit on a sunny slope, and half-hidden by the raspberry bushes, Nature blends them with the scene so deftly that even they become picturesque.

The little round "thirds," as they are termed, into which the berries are gathered, are carried out of the sunlight to sheds and barns; the packer receives them, giving tickets in exchange, and then, too often with the deliberation and ease induced by the summer heat, packs them in crates. As a result, there is frequently a hurry-scurry later in the day to get the berries off in time.

The Fastolff, Northumberland Fillbasket, and Knevett's Giant are fine old English varieties that are found in private gardens, but have never made their way into general favor.

The Franconia is now the best foreign variety we have. It was introduced from Paris by Mr. S. G. Perkins, of Boston, about thirty-seven years ago, and is a large, obtuse, conical berry, firm, thus carrying well to market, and although a little sour, its acid is of a rich, sprightly character. It is raised largely in Western New York, and in northern latitudes is one of the most profitable.

It is almost hardy in the vicinity of Rochester, receiving by some growers no winter protection. Its lack of hardiness with us, and further southward, is due to its tendency —common to nearly all foreign berries—to lose its foliage in August. I am inclined to think that it would prove one of the most profitable in Canada, and that if it were simply pinned down to the surface of the ground, and thus kept under the deep snows, it would rarely suffer from the cold. It should be distinctly understood that the climate of Canada, if winter protection is given—indeed, I may say, without protection—is far better adapted to tender raspberries than that of New Jersey, Virginia, or even Pennsylvania.

The long continuance of the Franconia in bearing is one of its best qualities. We usually enjoy its fruit for six

weeks together. Its almost globular shape is in contrast with another excellent French variety, the Belle de Fontenay, a large, long, conical, but somewhat irregular-shaped berry of very superior flavor. Mr. Fuller says that it is entirely hardy. It survives the winter without protection on my grounds. The canes are very stocky and strong, and unless growing thickly together are branching. Its most marked characteristic, however, is a second crop in autumn, produced on the tips of the new canes. If the canes of the previous year are cut even with the ground early in spring, the new growth gives a very abundant autumn crop of berries, which, although much inclined to crumble in picking, and to be irregular in shape, have still the rare flavor of a delicious fruit long out of season. It certainly is the best of the fall-bearing kinds, and deserves a place in every garden. There are more profitable market varieties, however; but, if the suckers are vigorously destroyed, and the bearing canes cut well back, the fruit is often very large, abundant, and attractive, bringing the highest prices. As a plantation grows older, the tendency to sucker immoderately decreases, and the fruit improves.

The Belle de Pallua and Hornet are also French varieties that in some sections yield fine fruit, but are too uncertain to become favorites in our country.

I have a few canes of a French variety that Mr. Downing imported a number of years since, and of which the name has been lost. It certainly is the finest raspberry I have ever seen, and I am testing its adaptation to various soils.

Having named the best-known foreign varieties, I will now turn to *R. Strigosus*, or our native species, which is scattered almost everywhere throughout the North. In its favorite haunts by roadside hedge and open glade in the forest, a bush is occasionally found producing such fine fruit that the delighted discoverer marks it, and in the autumn transfers it to his garden. As a result, a new variety is often heralded throughout the land. A few of these

wildings have become widely popular, and among them the Brandywine probably has had the most noted career.

Mr. William Parry, of New Jersey, who has been largely interested in this variety, writes to me as follows:

"I have never been able to trace the origin of this berry. It attracted attention some eight or ten years since in the Wilmington market, and was for a time called the 'Wilmington.'"

Subsequently Mr. Edward Tatnall, of that city, undertook to introduce it by the name of Susqueco, the Indian name for the Brandywine. It soon became the principal raspberry grown along the Brandywine Creek, and as the market-men would persist in calling it after its chief haunt, it will probably bear the historical name until it passes wholly out of favor. Its popularity is already on the wane, because of its dry texture and insipid flavor, but its bright color, good size, and especially its firmness and remarkable carrying qualities, will ever lead to its ready sale in the market. It is not a tall, vigorous grower, except in very rich land. The young canes are usually small, slender, of a pale red color, and have but few spines. Like nearly all the *R. Strigosus* species, it tends to sucker immoderately. If this disposition is rigorously checked by hoe and cultivator, it is productive: otherwise, the bearing canes are choked and rendered comparatively unfruitful. This variety is waning before the Cuthbert—a larger and much better berry.

The Turner is another of this class, and, in Mr. Charles Downing's opinion, is the best of them. It was introduced by Professor J. B. Turner, of Illinois, and is a great favorite in many parts of the West. It has behaved well on my place for several years, and I am steadily increasing my stock of it. I regard it as the hardiest raspberry in cultivation, and a winter must be severe, indeed, that injures it. Like the Crescent Seedling strawberry, it will grow

anywhere, and under almost any conditions. The laziest man on the continent can have its fruit in abundance, if he can muster sufficient spirit to put out a few roots, and hoe out all the suckers except five or six in the hill. It is early, and in flavor surpasses all of its class; the fruit is only moderately firm. Plant a few in some out-of-the-way place, and it will give the largest return for the least amount of labor of any kind with which I am acquainted. The canes are very vigorous, of a golden reddish-brown, like mahogany, over which spreads in many places a purple bloom, like that on a grape, and which rubs off at the touch. It is almost free from spines, and so closely resembles the Southern Thornless in all respects that I cannot distinguish between them.

The Turner is a fine example of the result of persistent well-doing. After having been treated slightingly and written down at the East for ten years or more, it is now steadily winning its way toward the front rank. Mr. A. S. Fuller, who has tried most of the older varieties, says that he keeps a patch of it for his own use, because it gives so much good fruit with so little trouble.

I shall give its origin in Professor Turner's own words, as far as possible:

"Soon after I came to Illinois, in 1833, I obtained, through a friend from the East, some raspberries sold to me as the 'Red Antwerp.' I do not know or believe that there was at that time any other red raspberry within one hundred miles of this place. Indeed, I have never seen a native wild red raspberry in the State, though it may be there are some. I found the Antwerp would not stand our climate, but by extreme care I protected it one winter, and it bore some fruit. I conceived the idea of amusing my leisure hours from college duty by raising new seedling raspberries, strawberries, etc., that would be adapted to the climate of the State. I had only a small garden spot, no particular knowledge of the business, and no interest in it outside of

the public good. I read upon the subject, as far as I then could, and planted and nursed my seedlings. Out of hundreds or thousands sown, I got one good early strawberry, which had a local run for a time; one fair blackberry, but no grapes or raspberries that seemed worth anything. The seeds of the raspberries were sown in a bed back of my house, and the shoots reserved were all nurtured on the same bed. After I supposed them to be a failure, I set out an arbor vitæ hedge directly across the raspberry bed, making some effort to destroy the canes so that the little cedars might grow. Sometimes, when they were in the way of the cedars they were hoed out. If any of them bore berries, the fowls doubtless destroyed them, or the children ate them before they ripened, until the cedars got so high as to give them protection. Then the children found the ripe fruit, and reported it to me. I have not the least doubt but this raspberry came from a seed of the plants obtained from the East as the Red Antwerp. The original canes may have been false to name, or a mixture of the true and false. Whatever they were, they bore good, red berries, which I supposed to be Antwerps; but the canes were so tender as to be worthless. It is wholly impossible that the new variety should have come from any other seed than that sown by me where the vitæ hedge now stands."

This letter is very interesting in showing how curiously some of our best varieties originate. Moreover, it suggests a dilemma. How is it possible that an Antwerp—one of the most tender varieties—could have been the parent of the hardiest known raspberry? How could a sort having every characteristic of our native *R. Strigosus* spring direct from *R. Idæus?*

I have been familiar with the Antwerps all my life, and can see no trace of them in this hardy berry. Mr. A. S. Fuller writes to me, "The Turner is a true native—*R. Strigosus;*" and Mr. Charles Downing holds the same opinion. Hence I am led to believe that there was a native

variety among the plants the professor obtained from the East, or that a seed of a native was dropped among the cedars by a bird, or brought thither in the roots of the cedars. Be this as it may, Professor Turner's good motives have been rewarded and he has given the public an excellent raspberry.

In connection with this subject, Mr. Fuller added the following fact, which opens to the amateur a very interesting field for experiment: "If there is any doubt in regard to such matters, raise a few seedlings of the variety, and if it is a cross or hybrid, a part of the seedlings will revert back to each parent, or so near them that there will be no difficulty in determining that there was a mixture of blood. If all our so-called hybrid fruits were thus tested, we would then know more of their true parentage." In the sunny laboratory of the garden, therefore, Nature's chemistry will resolve these juicy compounds back into their original constituents.

The Highland Hardy, or Native, also belongs to this species, and is quite a favorite still in some localities; but it has had its day, I think. Its extreme earliness has made it profitable in some regions; but its softness, small size and wretched flavor should banish it from cultivation as soon as possible.

There are others, like the Thwack, Pearl, and Bristol; they are but second rate, being inferior in most regions to the Brandywine, which they resemble.

In my opinion, the chief value of *R. Strigosus* is to be found in two facts. In the first place, they endure the severe Northern winters, and—what is of far more consequence—their best representatives thrive in light soils, and their tough foliage does not burn under the hot sun. It thus becomes the one species of *red* raspberry that can be raised successfully in the South, and from it, as a hardy stock, we should seek to develop the raspberries of the future.

CHAPTER XXII

RUBUS OCCIDENTALIS—BLACK-CAP AND PURPLE CANE RASPBERRIES

WE now turn to the other great American species —*Rubus Occidentalis*—the well-known black-cap, or thimble berry, that is found along almost every roadside and fence in the land. There are few little people who have not stained their lips and fingers, not to mention their clothes, with this homely favorite. I can recall the days when, to the horror of the laundress, I filled my pockets with the juicy caps. It is scarcely necessary to recall its long, rambling, purple shoots, its light-green foliage, silvery on the under side, its sharp and abundant spines, from which we have received many a vicious scratch. Its cultivation is so simple that it may be suggested in a few sentences. It does not produce suckers, like *R. Strigosus*, but the tips of the drooping branches root themselves in the soil during August and September, forming young plants. These, planted, produce a vigorous bush the first year that bears the second season, and then dies down to the perennial root, as is the case with all raspberries. Usually, the tips of the *young* canes will take root, if left to themselves, unless whipped about by the wind. If new plants in abundance are desired, it is best to assist Nature, however, by placing a little earth on the tip just after it begins to enlarge slightly, thus showing it is ready to take root. This labor is quickly performed by throwing a handful or two of earth on the tips with a trowel. The tips do not all mature for propagation at one time; therefore, it is well to go over the plantation every two weeks after the middle of August and

cover lightly with earth only such as are enlarged. If covered before this sign of readiness appears, the tip merely decays. If a variety is very scarce, we may cover not only the tips, but also much of the cane, lightly—an inch or two—with earth, and each bud will eventually make a plant. This should not be done, however, until the wood is well ripened, say about the first of October. Throw a few leaves over such layered canes in November, and divide the buds and roots into separate plants early in spring. They will probably be so small as to need a year in the nursery row. Sometimes, after the first tip is rooted, buds a little above it will push into shoots which also will root themselves with slight assistance, and thus the number of new plants is greatly increased. Spring is by far the best time, at the North, for plantiug these rooted tips; but it should be done as early as possible, before the bud has started into its brittle, succulent growth. At the South, November is probably the best season for planting. It is a species that adapts itself to most soils, even the lightest, and endures much neglect. At the same time, it responds generously to good culture and rigorous pruning, and if moisture is abundant the yield is simply enormous. It not only thrives far to the north, but can also be grown further south than any other class of raspberries.

In planting, spread out the roots and let them go down their full length, but do not put over an inch or two of soil on the bud from which the new canes are to spring. Press the earth firmly *around* this bud, but *not on* it. Let the rows be six feet apart, and the plants three feet from each other in the row; at this distance, 2,400 will be required for an acre. Summer pinching back will transform these sprawling, drooping canes into compact, stocky bushes, or ornamental shrubs that in sheltered locations will be self-supporting. Clean culture, and, as the plantation grows older, higher stimulation, greatly enhance success. After the plants begin to show signs of age and feebleness, it is best to set out young plants on new ground.

The varieties of this species are almost innumerable, since seedlings come up by the million every year; but the differences between the majority of them are usually very slight. There are four kinds, however, that have won honorable distinction and just popularity. The earliest of these is Davidson's Thornless, said to have originated in the garden of Mrs. Mercy Davidson, Towanda, Erie Co., N. Y. It is nothing like so vigorous a grower as the other three varieties; but the sweetness of the fruit and the freedom from thorns make it desirable for the home garden. Unless high culture or moist soil is given, I do not recommend it for market.

Next in order of ripening is the Doolittle, or American Improved, found growing wild, about thirty-five years since, by Leander Joslyn, of Phelps, Ontario Co., N. Y., and introduced by Mr. H. H. Doolittle. This, hitherto, has been the most popular of all the species, and thousands of bushels are annually raised for market. The plant is exceedingly vigorous, producing strong, branching canes that literally cover themselves with fruit. I have seen long rows fairly black with caps. Perhaps it should be stated that the thorns are vigorous also.

Latest in ripening is the Mammoth Cluster, or McCormick, which, thus far, has been my favorite. It is even more vigorous than the preceding, but not so briery or branching. The fruit is produced usually in a thick cluster or bunch at the end of the branch, and they ripen more together than the other kinds. The caps, too, are much larger, more juicy and fine-flavored. One is less conscious of the seeds. Between the thumb and finger you can often gather a handful from a single spray, it is so prodigiously productive. Thus far it has been unsurpassed, either for home use or market; but now it is encountering a rival in the Gregg, a new variety that is attracting much attention. Its history, as far as I have been able to learn it, is as follows:

In the latter part of June, 1866, this black raspberry was

found growing wild in a ravine on the Gregg farm, which is located in Ohio Co., Indiana. The original bush "was bending under the weight of colossal-sized clusters. It was then a single clump, surrounded by a few young plants growing from its tips. Before introducing it to the public, we gave it a most thorough and complete trial. We have put it on the tables of some of the most prominent horticul tural societies, and by each it has been voted the highest rank in their fruit lists. At the Centennial Exposition, at Philadelphia, in competition with all the prominent varieties in the world, it was ranked highest by the judges. During eleven years of observation it has survived the coldest winters, and never failed to yield an abundant crop. It is a vigorous, rapid grower, producing strong, well-matured canes by fall. The fruit is beautiful in appearance, delicious, possessing excellent shipping and keeping qualities."

The above is a mild and condensed statement of its claims, as set forth by Messrs. R. & P. Gregg, proprietors of the Gregg farm, and I believe these gentlemen have given a correct account of their experience. As the result of much inquiry, it would appear that this variety is also doing well throughout the country at large.

Mr. N. Ohmer, who has been most prominent in introducing the Gregg, gives the following account of his first acquaintance with it: "At a meeting of the Indiana State Horticultural Society, held at Indianapolis, a gentleman asked for the privilege of making some remarks about a new black raspberry that he was cultivating. Being pretty long-winded, as most lawyers are, he spoke so long, and said so much in favor of his berry, that no one believed him, and were glad when he got through. The summer following, I chanced to call on the Secretary of the Indiana State Board of Agriculture, in the Capitol building, and was surprised to see on his table about half a peck of berries and an armful of canes loaded with the largest, handsomest, and best black raspberries I had ever seen. Mr.

Herron, the Secretary, informed me that they were grown by Messrs. R. & P. Gregg. I obtained two hundred plants, a few of which bore fruit so fine, the following season, that all who saw it wanted plants." It was learned that Mr. Gregg was the lawyer who was thought "long-winded," and many who then yawned have since thought, no doubt, that they might have listened with much profit, for the demand for the plants has become greater than the supply. Only time can show whether the Gregg is to supersede the Mammoth Cluster. I observe that veteran fruit growers are very conservative, and by no means hasty to give a newcomer the place that a fine old variety has won by years of excellence in nearly all diversities of soil and climate. The Gregg certainly promises remarkably well, and Mr. Thomas Meehan, editor of the "Gardener's Monthly," who is well known to be exceedingly careful and conscientious in indorsing new fruits, writes: "We believe this variety is generally larger than any other of its kind yet known."

There are many other candidates for favor, but thus far they are untried, or have not proved themselves equal to the kinds I have named.

Quite a distinct branch of *R. Occidentalis* is the Purple Cane family—so named, I think, from the purple cane raspberry that was so well known in old gardens a few years ago, but since it has been superseded by better kinds is now fast passing out of cultivation. It almost took care of itself in our home garden for forty years or more, and its soft, small berries would melt in one's mouth. Its canes were smooth and its fruit of a dusky-red color. In other respects, it resembles the black-cap tribe.

The Catawissa, found growing in a Pennsylvania graveyard, is another berry of this class, which produces a second crop in autumn. It is tender in the Northern States, and has never become popular.

The Philadelphia is the best known of the class, and at one time was immensely popular. Its canes are smooth, stout, erect in growth, and enormously productive of

medium-sized, round, dusky-red berries of very poor flavor. It throve so well on the light soils about Philadelphia, that it was heralded to the skies, and the plants sold at one time as high as $40 per 100, but the inferior flavor and unattractive appearance of the fruit caused it to decline steadily in favor, and now it has but few friends. Unlike others of its class, it does not root from the tips, but propagates itself by suckers, producing them sparingly, however. When it was in such great demand, the nurserymen increased it by root cuttings, forced under glass.

CHAPTER XXIII

THE RASPBERRIES OF THE FUTURE

WE now come to a class that are destined, I think, to be the raspberries of the future, or, at least, a type of them. I refer to the seedlings of the three original species that have been described. As a rule (having exceptions of course), these native seedling varieties are comparatively hardy, and adapted to the climate of America. This adaptation applies to the South in the proportion that they possess the qualities of the *Rubus Strigosus* or *Occidentalis*. To the degree that the foreign element of *R. Idæus* exists, they will, with a few exceptions, require winter protection, and will be unable to thrive in light soils and under hot suns. Forgetfulness of this principle is often the cause of much misapprehension and undiscriminating censure. I have known certain New Jersey fruit growers to condemn a variety unsparingly. Would it not be more sensible to say it belongs to the *R. Idæus* class, and, therefore, is not adapted to our climate and light soil, but in higher latitudes and on heavy land it may prove one of the best?

It should here be premised that these seedlings originated in this country. Perhaps they are the product solely of our native species, or they may result from crossing varieties of *R. Idæus*, in which case they will exhibit the characteristics of the foreign species; or, finally, from the foreign and our native species may be produced a hybrid that will combine traits of each line of its lineage. A conspicuous example of the second statement may be seen in Brinkle's Orange, origi-

nated by Dr. Brinkle many years ago. It is essentially an Antwerp in character, and yet it is more vigorous, and adapted to a wider range of country than the Antwerp. The berry is of a beautiful buff color, and its delicious flavor is the accepted standard of excellence. At the same time, it is well known that it will not thrive under hot suns or upon light land. It can be raised south of New York only in cool, moist soils, and in half-shady locations; but at the North, where the conditions of growth are favorable, it produces strong branching canes, covered with white spines, and is exceedingly productive of large, light-colored berries that melt on the tongue. There is the same difference between it and the Brandywine that exists between Stowell's Evergreen and flint field corn. It invariably requires winter protection.

The Pride of the Hudson possesses the same general character as the Orange, and approaches it very nearly in excellence. It certainly is the largest, most beautiful red raspberry now before the public; but in its later development it has shown such sensitiveness to both heat and cold that I cannot recommend it for general cultivation. Give it a moist soil and a half-shady location, such as may be found on the northern side of a fence or hedge, and it will become the pride of any northern garden; but in the South, and on light soils, it can scarcely live. It should have winter protection.

In contrast with these native berries of foreign parentage, we have the Herstine; Mr. B. K. Bliss, the well-known seedsman of New York City, kindly furnishes me the following facts of its history: "About ten years since I was invited, with several gentlemen (mostly horticulturists), to visit the late Mr. Herstine, at Philadelphia. We were to examine a lot of seedling raspberries, and select names for those that we thought worthy of general cultivation. We found quite a company there from the vicinity of Philadelphia and from Washington, while New York was represented by such eminent authorities as Dr. Thurber and

A. S. Fuller. The raspberry bushes were completely loaded with large fine fruit—the finest I ever saw. Each variety was carefully examined, and the guests voted as to which, in his opinion, was the best. The Herstine stood first and the Saunders second. Mr. Herstine explained that they were raised from the Allen raspberry, which had been planted in alternate rows with the Philadelphia.'' This parentage would make it a hybrid of the *R. Strigosus* and the purple cane branch of the *R. Occidentalis* species; but the plant and fruit indicate the presence, also, of the *R. Idæus* element. After several years' experience on my own place, I regard it as the best early raspberry in existence. The berry is large, obtusely conical, bright red, and delicious in flavor. It is scarcely firm enough for market where it must be sent any great distance, but if picked promptly after it reddens, and packed in a cool, airy place, it carries well and brings good prices. The canes are strong, red, stocky, and covered with spines. They are but half-hardy, and I think it is best to cover them before the first of December, in our latitude. The canes of the Saunders, also sent out by Mr. Herstine, are much darker in color, and not so vigorous, but sufficiently so. The berries are large, ripen later, are more globular, and are of the same excellent quality. It deserves greater popularity than it has received. It is, also, only half-hardy.

In the Clarke, we undoubtedly have a variety containing considerable of the *R. Idæus* element. The berries are often very large, bright crimson, conical, with large, hairy grains. Occasionally, the fruit on my vines was very imperfect, and crumbled badly in picking. I found that by cutting the canes rigorously back—even one-half—I obtained much larger and more perfect berries, and in increased quantities. The canes are very strong, upright growers, ending usually in a thick tuft of foliage, rather than in long, drooping tips. It was originated by Mr. E. E. Clarke, of New Haven, Conn., and is but half-hardy.

In the New Rochelle, we have a hybrid of the black-cap

and red raspberry, the *R. Occidentalis* element predominating, and manifesting itself in the stocky and branching character of the canes, and in the fact that they propagate themselves by tips, and not suckers. The New Rochelle, originated by Mr E. W. Carpenter, of Rye, N. Y., is perhaps the best of this class. It is very vigorous, hardy, and enormously productive, and the fruit is of good size. I do not like its sharp acid, however, and its dun or dusky-brown color will probably prevent it from becoming a favorite in market, since bright-hued berries are justly much preferred.

But Mr. Carpenter has sent out another seedling which, I think, is destined to have a brilliant future—the Caroline. It is thought to be a cross between the Catawissa and Brinkle's Orange. The canes are perfectly hardy, very strong, vigorous, branching, light-red, with a lighter bloom upon them here and there. It suckers freely, and also propagates itself sparingly from the tips. The fruit is exceedingly abundant and is a round cap of a beautiful buff color, almost equalling Brinkle's Orange in flavor. I think it will grow anywhere, and thus will find a place in innumerable gardens where the Orange does not thrive. At the same time, it is good enough for any garden.

The Ganargua was said to be a hybrid, but Mr. J. J. Thomas writes to me: "I have never been able to discover proof that it is one. I think it all *R. Occidentalis*—a variety."

The Reliance, a seedling of the Philadelphia, but far superior to it, is doing remarkably well on my place, and I hear favorable accounts from other localities.

There are many others that are either old and passing into obscurity or else so new and dubious in character that limited space forbids their mention. We will close this sketch of varieties with the Cuthbert, which that experienced and careful horticulturist, Dr. Hexamer, calls the "best raspberry now in existence."

This is a chance seedling, which the late Thomas Cuth-

bert found in his garden, at Riverdale, N. Y. His son has kindly furnished the following facts:

"The raspberry in question was discovered by my father about eleven years ago in the garden of our country seat at Riverdale-on-the-Hudson. It is probably a seedling of the Hudson River Antwerp, as it was found growing near the edge of a patch of that variety, but its great vigor of growth and the size and quality of the fruit marked it at once as a new and distinct kind. Its canes were carefully separated from the others and a small plantation made of them. The next year, and from time to time since, plants were given to our friends in various parts of the State for trial. Without exception, their reports have been favorable, particular mention having been made of their unusual vigor of growth, their hardiness, and the firmness and good keeping qualities of the fruit. The first year or so we gave the canes winter protection, but finding that it was unnecessary, we have discontinued it, and I have never heard of the canes being winter-killed."

From other sources I learn that Mr. Cuthbert made an arrangement with a nurseryman by the name of Thompson, to propagate and send out the variety. This gentleman dying soon after, the stock came into the possession of Mr. H. J. Corson, of Staten Island, N. Y., and by him and Mr. I. J. Simonson, a florist, the plants have been sent out to different parts of the country. This dissemination was very limited, and was characterized by an almost utter absence of heralding and extravagant praise. The berry has literally made its way on its own merits. Dr. Hexamer remarked to me that he had had it for years, and had wondered why its merits were so overlooked. My attention was called to it in the summer of 1878, and I took pains to see it in several localities. The large size of the berries, their firmness and fine flavor, convinced me that it was very valuable, and the fact that I found it flourishing

luxuriantly on New Jersey sand, and maintaining a perfectly healthful foliage under an August sun, led me to believe that we had at last found a first-class variety that would thrive on light soils and under hot suns.

The late W. C. Bryant, the poet, himself well versed in horticulture, closed a letter to me with the following words:

"It has always seemed to me a scandal to our horticulture that in a region where the raspberry grows wild, we should not have a sort that would resist both the winter cold and summer heat, and produce abundantly."

After another year of observation and of much correspondence, extending even to California, I am convinced that the Cuthbert does "resist both the winter cold and summer heat, and produce abundantly," far better than any other raspberry that equals it in size and flavor. The canes are strong, upright, branching, if space permits, reddish-brown, spines abundant, but not very long and harsh. It is a rampant grower on good soil, but the foliage, so far from being rank and large, is delicate, and the under side of the leaves has a light, silvery hue. After once getting hold of the soil, it suckers immoderately, but is no worse in this respect than other vigorous varieties; and this tendency rapidly declines after the second year. Is it perfectly hardy? No; and I do not know of a single good raspberry that is; except, perhaps, the Turner, which, however, is inferior to the Cuthbert. I have seen the latter badly winter-killed, but it had stood eight years on the same ground without injury before. Then, because of a rank growth late in the season, that especial patch was hit hard, while other fields, but a few miles away, were unharmed. If planted on well-drained soil, where the wood could ripen well, I think it would be injured very rarely, if ever; but I have no faith in talk about "perfectly hardy raspberries." Those who observe closely will often find our hardy native species killed to the ground, and I think many varieties suffer more from the mild, variable winters of the Middle

States than from the steady cold and snowy winters of the North. Moreover, any variety that has not the power of maintaining a healthy foliage through the hot season will usually be too feeble to resist the winter following. The question of hardiness can often be settled better in August than in January. One of the most hopeful features of the Cuthbert, therefore, is its tough, sun-enduring foliage, which enables the wood to ripen perfectly. It has never received winter protection thus far, either in this region or in Michigan, where it is largely raised, but it may be found necessary to shield it somewhat in some localities. It is both absurd and dishonest to claim perfection for a fruit, and the Cuthbert, especially as it grows older and loses something of its pristine vigor, will, probably, like all other varieties, develop faults and weaknesses. We cannot too much deprecate the arrogant spirit often manifested in introducing new fruits. Interested parties insist on boundless praise, and if their advice were followed, the fine old standards would be plowed out to make room for a newcomer that often proves, on trial, little better than a weed. The Cuthbert is not exactly a novelty. Through the gifts of the originator, and sales running through several years, it has become widely scattered, and has proved a success in every instance, as far as I can learn. I show my faith in it by my works, for I am setting it out more largely than all other kinds together, even going so far as to rent land for the purpose. I am satisfied, from frequent inquiries in Washington Market, that it will take the lead of all others, and it is so firm that it can be shipped by rail, like a Wilson strawberry.

In Delaware and Southern New Jersey, a variety named "Queen of the Market" is being largely set out. I have this variety in my specimen-bed, side by side with plants that came from Thomas Cuthbert's garden, and am almost satisfied that they are identical, and that Queen of the Market is but a synonym of the Cuthbert. I have placed the canes and spines of each under a powerful microscope and can

detect no differences, and the fruit also appeared so much alike that I could not see wherein it varied. Plants of this variety were sent to Delaware some years since as they were to Michigan and California, and, wherever tested, they seem to win strong and immediate favor. Its chief fault in this locality is its lateness.

CHAPTER XXIV

BLACKBERRIES—VARIETIES, CULTIVATION, ETC.

THE small-fruit branch of the rose family is assuredly entitled to respect when it is remembered that the blackberry is the blackest sheep in it. Unlike the raspberry, the drupes cling to the receptacle, which falls off with them when mature, and forms the hard, disagreeable core when the berry is black, but often only half ripe. The bush is, in truth, what the ancients called it—a bramble, and one of our Highland wildcats could scarcely scratch more viciously than it, if treated too familiarly; but, with judicious respect and good management, it will yield large and beautiful berries.

It would seem that Nature had given her mind more to blackberries than to strawberries, for, instead of merely five, she has scattered about 150 species up and down the globe. To describe all these would be a thorny experience indeed, robbing the reader of his patience as completely as he would be bereft of his clothing should he literally attempt to go through them all. Therefore, I shall give Professor Gray's description of the two species which have furnished our few really good varieties, and dismiss with mere mention a few other species.

"*Rubus Villosus*, High Blackberry. Everywhere along thickets, fence-rows, etc., and several varieties cultivated; stems one to six feet high, furrowed; prickles strong and hooked; leaflets three to five, ovate or lance-ovate, pointed, their lower surface and stalks hairy and glandular, the mid-

dle one long-stalked and sometimes heart-shaped; flowers racemed, rather large, with short bracts; fruit oblong or cylindrical.

"*R. Canadensis*, Low Blackberry or Dewberry. Rocky and sandy soil; long trailing, slightly prickly, smooth or smoothish, and with three to seven smaller leaflets than in the foregoing, the racemes of flowers with more leaf-like bracts, the fruit of fewer grains and ripening earlier."

The *R. Cuneifolius*, or Sand Blackberry, is common in the sandy ground and barrens from New Jersey southward; the *R. Trivialis*, Southern Low Blackberry, is found in light soils from Virginia southward; the *R. Hispidus* is a Running Swamp Blackberry whose long, slender stems creep through low, damp woods and marshes; the *R. Spectabilis* produces purple solitary flowers, and grows on the banks of the Columbia River in the far Northwest. Whatever improvements may originate from these species in the future, they have not as yet, to my knowledge, given us any fine cultivated variety.

R. fruticosus is the best-known European species, but neither has it, as far as I can discover, been the source of any varieties worthy of favor. It is said to have a peculiar flavor, that produces satiety at once. The blackberry, therefore, is exceptional, in that we have no fine foreign varieties, and Mr. Fuller writes that he cannot find "any practical information in regard to their culture in any European work on gardening."

The "bramble" is quite fully treated in Mr. R. Thompson's valuable English work, but I find little to interest the American reader. He suggests that the several native species that he describes are capable of great improvement, but I cannot learn that such effort has ever been made successfully. I do not know of any reason why our fine varieties will not thrive abroad, under conditions that accord with their nature.

In America there are innumerable varieties, since Nature

produces wild seedlings on every hillside, and not a few seeds have been planted by horticulturists in the hope of originating a prize berry. Nature appears to have had the better fortune, thus far, for our best varieties are chance seedlings, found growing wild.

It is not so many years since the blackberry was regarded as merely a bramble in this country, as it now is abroad, and people were content with such fruit as the woods and fields furnished. Even still, in some localities, this supply is so abundant as to make the culture of the blackberry unprofitable. But, a number of years since, Mr. Lewis A. Seacor led to better things, by observing on the roadside, in the town of New Rochelle, Westchester County, New York, a bush flourishing where Nature had planted it. This variety took kindly to civilization, and has done more to introduce this fruit to the garden than all other kinds together. Mr. Donald G. Mitchell, in his breezy out-of-door book, "My Farm at Edgewood," gives its characteristics so admirably that I am tempted to quote him:

"The New Rochelle or Lawton Blackberry has been despitefully spoken of by many; first, because the market fruit is generally bad, being plucked before it is fully ripened; and next, because, in rich, clayey grounds, the briers, unless severely cut back, grow into a tangled, unapproachable forest, with all the juices exhausted in wood. But upon a soil moderately rich, a little gravelly and warm, protected from winds, served with occasional top-dressings and good hoeings, the Lawton bears magnificent burdens. Even then, if you wish to enjoy the richness of the fruit, you must not be hasty to pluck it. When the children say, with a shout, 'The blackberries are ripe!' I know they are black only, and I can wait. When the children report, 'The birds are eating the berries!' I know I can wait. But when they say, 'The bees are on the berries!' I know they are at their ripest. Then, with baskets, we sally out; I

taking the middle rank, and the children the outer spray of boughs. Even now we gather those only which drop at the touch; these, in a brimming saucer, with golden Alderney cream and a *soupçon* of powdered sugar, are Olympian nectar; they melt before the tongue can measure their full roundness, and seem to be mere bloated bubbles of forest honey."

Notwithstanding this eloquent plea and truthful statement, the Lawton is decidedly on the wane. It is so liable to be winter-killed, even with best of care, and its fruit is so unpalatable, in its half-ripe condition, that it has given place to a more successful rival, the Kittatinny—discovered in Warren County, N. J., growing in a forest near the mountains, whose Indian name has become a household word from association with this most delicious fruit. Mr. Wolverton, in finding it, has done more for the world than if he had opened a gold mine. Under good culture, the fruit is very large; sweet, rich, and melting, when fully ripe, but rather sour and hard when immature. It reaches its best condition if allowed to ripen fully on the vines; but the majority of pickers use their hands only, and no more think of making nice discriminations than of questioning nature according to the Baconian method. They gather all that are black, or nearly so; but if this half-ripe fruit is allowed to stand in some cool, dry place for about twelve hours, Kittatinny berries may be had possessing nearly all their luscious qualities. The plant is an upright and very vigorous grower, exceedingly productive if soil and culture are suitable. Its leaves are long-pointed, "finely and unevenly serrate." The season of fruiting is medium, continuing from four to six weeks, if moisture is maintained. Both of these varieties are derived from the *Rubus villosus* species.

In contrast is the next-best known sort, Wilson's Early —having many of the characteristics of the Dewberry, or running blackberry, and, therefore, representing the second

species described, *R. Canadensis.* Whether it is merely a sport from this species, or a hybrid between it and the first-named or high blackberry, cannot be accurately known, I imagine; for it also was found growing wild by Mr. John Wilson, of Burlington, N. J. Under high culture, and with increasing age, the plants become quite erect and stocky growers, but the ends of the cane are drooping. Frequently, they trail along the ground, and root at the tips, like the common Dewberry; and they rarely grow so stocky but that they can be bent over and covered with earth or litter, as is the case with the tender raspberries. It is well that this is possible, for it has so little power of resisting frost that a winter of ordinary severity kills the canes in the latitude of New York. I have always covered mine, and thus secured, at slight expense, a sure and abundant crop. The fruit is earlier than the Kittatinny, and tends to ripen altogether in about ten days. These advantages, with its large size and firmness, make it a valuable market berry in New Jersey, where hundreds of acres of it have been planted, and where it is still very popular. Throughout the North and West, it has been found too tender for cultivation, unless protected. In flavor, it is inferior to the Kittatinny or Snyder.

For many years, the great desideratum has been a perfectly hardy blackberry, and this want has at last been met in part by the Snyder, a Western variety that seems able to endure, without the slightest injury, the extremes of temperature common in the Northwestern States. From Nebraska eastward, I have followed its history, and have never heard of its being injured by frost. It originated on, or in the vicinity of, Mr. Snyder's farm, near La Porte, Ind., about 1851, and is an upright, exceedingly vigorous, and stocky grower, a true child of the *R. villosus.* Its one fault is that it is not quite large enough to compete with those already described. On moist land, with judicious pruning, it could be made to approach them very nearly, however, while its earliness, hardiness, fine flavor, and abil-

ity to grow and yield abundantly almost anywhere, will lead to an increasing popularity. For home use, size is not so important as flavor and certainty of a crop. It is also more nearly ripe when first black than any other kind that I have seen; its thorns are straight, and therefore less vicious. I find that it is growing steadily in favor; and where the Kittatinny is winter-killed, this hardy new variety leaves little cause for repining.

There are several kinds that are passing out of cultivation, and not a few new candidates for favor; but the claims of superiority are as yet too doubtful to be recognized. Mr. James Wilson, of West Point, N. Y., found some magnificent wild berries growing on Crow Nest Mountain. The bush that bore them is now in my garden, and if it should produce fruit having a flavor equal to Rodman Drake's poem, Mr. Wilson has, then, found something more real than a "Culprit Fay." Occasionally, a thornless blackberry is heralded, and not a few have reason to recall the "Hoosac," which was generally found, I think, about as free from fruit as thorns. We have, also, the horticultural paradox of white blackberries, in the "Crystal," introduced by Mr. John B. Orange, of Albion, Illinois, and some others. They have little value, save as curiosities.

PROPAGATION, CULTURE, ETC.

In most instances I think more difficulty would be found in making a blackberry die than live. A plant set out in fall or early spring will thrive if given the ghost of a chance. Late spring planting, however, often fails if subjected to heat and drought while in the green, succulent condition of early growth. Like the raspberry, the blackberry should be set, if possible, while in a dormant condition. If planted late, shade should be given and moisture maintained until danger of wilting and shrivelling is past. I advise decidedly against late spring plantings on a large scale, but in early spring planting I have rarely lost a plant. Almost

all that has been said concerning the planting and propagation of raspberries applies to this fruit. Set the plants two or three inches deeper than they were before. With the exception of the early Wilson, all speedily propagate themselves by suckers, and this variety can be increased readily by root cuttings. Indeed, better plants are usually obtained from all varieties by sowing slips of the root, as has already been explained in the paper on raspberries.

The treatment of the blackberry can best be indicated by merely noting wherein its requirements differ from the last-named and kindred fruit. For instance, it does best on light soils and in sunny exposures. The partial shade, and moist, heavy land in which the raspberry luxuriates would produce a rank growth of canes that winter would generally find unripened, and unable to endure the frost. Warm, well-drained, but not dry land, therefore, is the best. On hard, dry ground, the fruit often never matures, but becomes mere collections of seeds. Therefore the need in the preparation of the soil of deep plowing, and the thorough loosening, if possible, of the subsoil with the lifting plow. Any one who has traced blackberry roots in light soils will seek to give them foraging-room. Neither does this fruit require the fertility needed in most instances by the raspberry. It inclines to grow too rankly at best, and demands mellowness rather than richness of soil.

More room should also be given to the blackberry than to the raspberry. The rows should be six feet apart in the garden and eight feet in field culture, and the plants set three feet apart in the rows. At this distance, 1,815 are required for an acre, if one plant only is placed in a hill. Since these plants are usually cheap, if one is small or unprovided with good roots, it is well to plant two. If the ground is not very fertile, it is well to give the young plants a good start by scattering a liberal quantity of muck compost down the furrow in which they are planted. This ensures the most vigorous growth of young canes in the rows rather than in the intervening spaces. As generally grown,

they require support, and may be staked as raspberries. Very often, cheap post-and-wire trellises are employed and answer excellently. Under this system they can be grown in a continuous and bushy row, with care against overcrowding.

The ideal treatment of the blackberry is management rather than culture. More can be done with the thumb and finger at the right time than with the most savage pruning-shears after a year of neglect. In May and June the perennial roots send up vigorous shoots that grow with amazing rapidity, until from five to ten feet high. Very often, this summer growth is so brittle and heavy with foliage, that thunder-gusts break them off from the parent stem just beneath the ground, and the bearing cane of the coming year is lost. These and the following considerations show the need of summer pruning. Tall, overgrown canes are much more liable to be injured by frost. They need high and expensive supports. Such branchless canes are by no means so productive as those which are made to throw out low and lateral shoots. They can always be made to do this by a timely pinch that takes off the terminal bud of the cane. This stops its upward growth, and the buds beneath it, which otherwise might remain dormant, are immediately forced to become side branches near the ground, where the snow may cover them, and over which, in the garden, straw or other light litter may be thrown, on the approach of winter. It thus is seen that by early summer pinching the blackberry may be compelled to become as low and bushy a shrub as we desire, and is made stocky and self-supporting at the same time. Usually it is not well to let the bushes grow over four feet high; and in regions where they winter-kill badly, I would keep them under three feet, so that the snow might be a protection. It should be remembered that the Kittatinny is so nearly hardy that in almost all instances a very slight covering saves it. The suckers that come up thickly between the rows can be cut away while small with the least possible

trouble; but leave the patch or field to its own wild impulses for a year or so, and you may find a "slip of wilderness" in the midst of your garden that will require not a little strength and patience to subdue. By far the best weapon for such a battle, and the best implement also for cutting out the old wood, is a pair of long-handled shears.

CHAPTER XXV

CURRANTS—CHOICE OF SOIL, CULTIVATION, PRUNING, ETC.

THEY were "curns" in our early boyhood, and "curns" they are still in the rural vernacular of many regions. In old English they were "corrans," because the people associated them with the raisins of the small Zante grape, once imported so exclusively from Corinth as to acquire the name of that city.

Under the tribe *Grossulariæ* of the Saxifrage family we find the *Ribes*, containing many species of currants and gooseberries; but, in accordance with the scope of this book, we shall quote from Professor Gray (whose arrangement we follow) only those that furnish the currants of cultivation.

"*Ribes rubrum*, red currant, cultivated from Europe, also wild on our northern border, with straggling or reclining stems, somewhat heart-shaped, moderately three to five lobed leaves, the lobes roundish and drooping racemes from lateral buds distinct from the leaf buds; edible berries red, or a white variety."

This is the parent of our cultivated red and white varieties. Currants are comparatively new-comers in the garden. When the Greek and Roman writers were carefully noting and naming the fruits of their time, the *Ribes* tribe was as wild as any of the hordes of the far North, in whose dim, cold, damp woods and bogs it then flourished, but, like other Northern tribes, it is making great improvement under the genial influences of civilization and culture.

Until within a century or two, gardeners who cultivated currants at all were content with wild specimens from the

woods. The exceedingly small, acid fruit of these wildings was not calculated to inspire enthusiasm; but a people possessing the surer qualities of patience and perseverance determined to develop them, and, as a result, we have the old Red and White Dutch varieties, as yet unsurpassed for the table. In the Victoria, Cherry, and White Grape, we have decided advances in size, but not in flavor.

CHOICE AND PREPARATION OF SOIL

The secret of success in the culture of currants is suggested by the fact that nature has planted nearly every species of the *Ribes* in cold, damp, northern exposures. Throughout the woods and bogs of the Northern Hemisphere is found the scraggy, untamed, hardy stock from which has been developed the superb White Grape. As with people, so with plants: development does not eradicate constitutional traits and tendencies. Beneath all is the craving for the primeval conditions of life, and the best success with the currant and gooseberry will assuredly be obtained by those who can give them a reasonable approach to the soil, climate, and culture suggested by their damp, cold, native haunts. As with the strawberry, then, the first requisite is, not wetness, but abundant and continuous moisture. Soils naturally deficient in this, and which cannot be made drought-resisting by deep plowing and cultivation, are not adapted to the currant. Because this fruit is found wild in bogs, it does not follow that it can be grown successfully in undrained swamps. It will do better in such places than on dry, gravelly knolls, or on thin, light soils; but our fine civilized varieties need civilized conditions. The well-drained swamp may become the very best of currant fields; and damp, heavy land, that is capable of deep, thorough cultivation, should be selected if possible. When such is not to be had, then, by deep plowing, subsoiling, by abundant mulch around the plants throughout the summer, and by occasional waterings in the garden, counteracting the

effects of lightness and dryness of soil, skill can go far in making good nature's deficiencies.

Next to depth of soil and moisture, the currant requires fertility. It is justly called one of the "gross feeders," and is not particular as to the quality of its food, so that it is abundant. I would still suggest, however, that it be fed according to its nature with heavy composts, in which muck, leaf-mould, and the cleanings of the cow-stable are largely present. Wood-ashes and bone-meal are also most excellent. If stable or other light manures must be used, I would suggest that they be scattered liberally on the surface in the fall or early spring and gradually worked in by cultivation. Thus used, their light heating qualities will do no harm, and they will keep the surface mellow and, therefore, moist.

The shadowy, Northern haunts of the wild currant also suggest that it will falter and fail under the Southern sun; and this is true. As we pass down through the Middle States, we find it difficult to make thrive even the hardy White and Red Dutch varieties, and a point is at last reached when the bushes lose their leaves in the hot season, and die. From the latitude of New York south, therefore, increasing effort should be made to supply the currants' constitutional need, by giving partial shade among pear or widely set apple-trees, or, better still, by planting on the northern side of fences, buildings, etc. By giving a cool, half-shady exposure in moist land, the culture of the currant can be extended far to the south, especially in the high mountain regions. Even well to the north it is unprofitable when grown on light, thin, poor land, unless given liberal, skilful culture.

PLANTING, CULTIVATION AND PRUNING

I regard autumn as the best season for planting currants, but have succeeded nearly as well in early spring. If kept moist, there is little danger of the plants dying at any time,

but those set in the fall or early spring make, the first year, a much larger growth than those planted when the buds have developed into leaves. Since they start so early, they should be set in the spring as soon as the ground is dry enough to work, and in the autumn, any time after the leaves fall or the wood is ripe. The plants of commerce are one, two and three years old, though not very many of the last are sold. I would as soon have one-year plants, if well rooted, as any, since they are cheaper and more certain to make strong, vigorous bushes, if given generous treatment in the open field, than if left crowded too long in nursery rows. For the garden, where fruit is desired as soon as possible, two and three year old plants are preferable. After planting, cut the young bushes back one-half or two-thirds, so as to ensure new and vigorous growth.

In field culture, I recommend that the rows be five feet apart, and the plants four feet from each other in the row. In this case 2,178 plants are required for an acre. If it is designed to cultivate them both ways, let the plants be set at right angles five feet apart, an acre now requiring 1,742 plants. Sink them two or three inches deeper than they stood in the nursery rows, and although in preparation the ground was well enriched, a shovel of compost around the young plant gives it a fine send-off, and hastens the development of a profitable bush. In the field and for market, I would urge that currants be grown invariably in bush, rather than in tree form. English writers, and some here who follow them, recommend the latter method; but it is not adapted to our climate, and to such limited attention as we can afford to give. The borers, moreover, having but a single stem to work upon, would soon cause many vacancies in the rows.

Currants are grown for market with large and increasing profits; indeed, there is scarcely a fruit that now pays better.

Mr. John S. Collins, of Moorestown, N. J., by the following ingenious, yet simple, invention, is able to drive through his currant and raspberry fields without injuring the plants.

"An ordinary cart is changed by putting in an axle fifteen inches longer than usual, the wheels thus making a track six feet and eight inches wide. The shafts and body of the cart are put just as close to one wheel as possible, so that the horse and the wheel will pass as near together, and as near in a line, as practicable. The axle of the other wheel being long, and bowing up several inches higher than ordinary in the middle, it passes over a row of bushes with little or no damage. Thus, fertilizers can be carried to all parts of the field."

Of course, it would not do to drive through bushes laden with fruit; but after they were picked, such a vehicle could cause but little injury.

In the garden and for home use there is the widest latitude. We may content ourselves, as many do, with a few old Red Dutch bushes that for a generation have struggled with grass and burdocks. We may do a little better, and set out plants in ordinary garden soil, but forget for years to give a particle of food to the starving bushes, remarking annually, with increasing emphasis, that they must be "running out." Few plants of the garden need high feeding more, and no others are more generally starved. I will guarantee that there are successful farmers who no more think of manuring a currant bush than of feeding crows. This fruit will live, no matter how we abuse it, but there are scarcely any that respond more quickly to generous treatment; and in the garden where it is not necessary to keep such a single eye to the margin of profit, many beautiful and interesting things can be done with the currant. The majority will be satisfied with large, vigorous bushes, well enriched, mulched and skilfully pruned. If we choose, however, we may train them into pretty little trees, umbrella, globe, or pyramid in shape, according to our fancy, and by watchfulness and the use of ashes, keep away the borers. In one instance I found a few vigorous shoots that had made a growth of nearly three feet in a single season. With the exception of the terminal bud and three or four

just below it, I disbudded these shoots carefully, imbedded the lower ends six inches in moist soil as one would an ordinary cutting, and they speedily took root and developed into little trees. Much taller and more ornamental currant and gooseberry trees can be obtained by grafting any variety we wish on the Missouri species (*Ribes aureum*). These can be made pretty and useful ornaments of the lawn, as well as of the garden. Instead, therefore, of weed-choked, sprawling, unsightly objects, currant bushes can be made things of beauty, as well as of sterling worth.

The cultivation of the currant is very simple. As early in the spring as the ground is dry enough, it should be thoroughly stirred by plow or cultivator, and all perennial weeds and grasses just around the bushes taken out with pronged hoes or forks. If a liberal top-dressing of compost or some other fertilizer was not given in the autumn, which is the best time to apply it, let it be spread over the roots (not up against the stems) before the first spring cultivation. While the bushes are still young, they can be cultivated and kept clean, like any hoed crop; but after they come into bearing—say the third summer—a different course must be adopted. If the ground is kept mellow and bare under the bushes, the fruit will be so splashed with earth as to be unsalable, and washed fruit is scarcely fit for the table. We very properly wish it with just the bloom and coloring which Nature is a month or more in elaborating. Muddy or rinsed fruit suggests the sty, not a dining-room. A mulch of leaves, straw, evergreen boughs—anything that will keep the ground clean—applied immediately after the early spring culture, is the best and most obvious way of preserving the fruit; and this method also secures all the good results which have been shown to follow mulching. Where it is not convenient to mulch, I would suggest that the ground be left undisturbed after the first thorough culture, until the fruit is gathered. The weeds that grow in the interval may be mowed, and allowed to fall under the bushes. By the end of June, the soil will have become so

fixed that, with a partial sod of weeds, the fruit may hang over, or even rest upon it, without being splashed by the heavy rains then prevalent. This course is not so neat as clean cultivation or mulching. Few fruit growers, however, can afford to make appearances the first consideration. I have heard of oats being sown among the bushes to keep the fruit clean, but their growth must check the best development of the fruit quite as much as the natural crop of weeds. It would be better to give clean culture, and grow rye, or any early maturing green crop, somewhere else, and when the fruit begins to turn, spread this material under the bushes. On many places, the mowings of weedy, swampy places would be found sufficient for the purpose. After the fruit is gathered, start the cultivator and hoe at once, so as to secure vigorous foliage and healthful growth throughout the entire summer.

Pruning may be done any time after the leaves fall, and success depends upon its judicious and rigorous performance. The English gardeners have recognized this fact, and they have as minute and careful a system as we apply to the grape. These formal and rather arbitrary methods can scarcely be followed practically in our hurried American life. It seems to me that I can do no better than to lay down some sound and general principles and leave their working out to the judgment of the grower. In most instances, I imagine, our best gardeners rarely trim two bushes exactly alike, but deal with each according to its vigor and natural tendencies; for a currant bush has not a little individuality.

A young bush needs cutting back like a young grapevine, and for the same reason. A grapevine left to itself would soon become a mass of tangled wood yielding but little fruit, and that of inferior quality. In like manner nature, uncurbed, gives us a great, straggling bush that is choked and rendered barren by its own luxuriance. Air and light are essential, and the knife must make spaces for them. Cutting back and shortening branches develops

fruit buds. Otherwise, we have long, unproductive reaches of wood. This is especially true of the Cherry and other varieties resembling it. The judicious use of the knife, kept up from year to year, will almost double their productiveness. Again, too much very young and too much old wood are causes of unfruitfulness. The skilful culturist seeks to produce and preserve many points of branching and short spurs, for it is here that the little fruit buds cluster thickly. When a branch is becoming black and feeble from age, cut it back to the root, that space may be given for younger growth. From six to twelve bearing stems, from three to five feet high, with their shortened branches and fruit spurs, may be allowed to grow from the roots, according to the vigor of the plant and the space allotted to it. Usually, too many suckers start in the spring. Unless the crop of young wood is valuable for propagation, all except such as are needed to renew the bush should be cut out as early as possible, before they have injured the forming crop. In England, great attention is paid to summer pruning, and here much might be accomplished by it if we had, or would take, the time.

CHAPTER XXVI

CURRANTS, CONTINUED—PROPAGATION, VARIETIES

PRUNING naturally leads to the subject of propagation, for much of that which is cut away, so far from being useless, is often of great value to the nurseryman; and there are few who grow this fruit for market who could not turn many an honest penny if they would take the refuse young wood of the previous summer's growth and develop it into salable bushes. In most instances a market would be found in their own neighborhood. Nothing is easier than success in raising young currant bushes, except failure. If cuttings are treated in accordance with their demand for moisture and coolness, they grow with almost certainty; if subjected to heat and drought, they usually soon become dry sticks. The very best course is to make and plant our cuttings in September or very early in October—just as soon as the leaves fall or will rub off readily. As is true of a root-slip, so also the wood cutting must make a callus at its base before there can be growth. From this the roots start out. Therefore, the earlier in the fall that cuttings are made, the more time for the formation of this callus. Often, autumn-planted cuttings are well rooted before winter, and have just that much start over those that must begin life in the spring. Six inches is the average length. See Figures A, B and C. Let the cuttings be sunk in deep, rich, moist, but thoroughly well-drained soil, so deeply as to leave but two or three buds above the ground. In the garden, where the design is to raise a few fine bushes for home use merely, let the rows be

two feet apart and the cuttings six inches apart in the row. In raising them by the thousand for market, we must economize space and labor; and therefore one of the best methods, after rendering the ground mellow and smooth, is

CURRANT CUTTINGS AND CALLUS

to stretch a line across the plat or field; then, beginning on one side of the line, to strike a spade into the soil its full depth, press it forward and draw it out. This leaves a slight opening, of the width and depth of the spade, and a boy following inserts in this three cuttings, one in the

middle and one at each end. The man then steps back and drives the spade down again about four inches in the rear of the first opening, and, as he presses his spade forward to make a second, he closes up the first opening, pressing—indeed, almost pinching—the earth around the three slips that have just been thrust down, until but one or two buds are above the surface. We thus have a row of cuttings, three abreast, and about three inches apart, across the entire field. A space of three feet is left for cultivation, and then we plant, as before, another triple row. These thick rows should be taken up the following fall, when the largest may be sold, or planted where they are to fruit, and the smaller ones replanted in nursery rows. When land is abundant the cuttings may be sunk in single rows, with sufficient space between for horse cultivation, and allowed to mature into two-year-old plants without removal. If these are not planted or sold, they should be cut back rigorously before making the third year's growth.

In moist land, cuttings can be made to grow even if set out late in the spring, especially if top-dressed and mulched; but if they are to be started on high, dry land, they should be out sufficiently early in the autumn to become rooted before winter. If our land is of a nature that tends to throw roots out of the ground—and moist, heavy land has this tendency—it may be best to bury the cuttings in bundles, tied up with fine wire, on a dry knoll, below the action of the frost, and set them out early—*as early as possible*—in the spring. At any season the rows of cuttings should be well top-dressed with fine manure, and if planted in autumn, they should be so well covered with straw, leaves, or some litter, as not to suffer or be thrown out in freezing and thawing weather. I manage to get half my cuttings out in the fall, and half in early spring.

In the greenhouse, and even out-of-doors, under very favorable circumstances, plants may be grown from single buds; and green wood also propagates readily under glass.

A vigorous young plant, with roots attached, may often

be obtained by breaking off the suckers that start beneath the surface around the stems; and, by layering or bending bushes over and throwing dirt upon them, new plants are readily made also; but more shapely, and usually more vigorous, bushes are obtained by simple cuttings, as I have described.

When it is designed to grow a cutting in a tree form, all the buds but two or three at the top should be carefully removed.

If we wish to try our fortune in raising new varieties, we must sow seeds of the very best specimens we can find, gathered when perfectly ripe. These seeds should never be kept where it is hot or very dry, and should be soaked for a day or two in tepid water before planting. Sow early in spring, quarter of an inch deep, in fine rich soil, which must continually be kept moist, but never wet. Top-dressings of very fine, light manure would keep the surface from baking, thus giving the seeds a chance to germinate. Tolerate no weeds. Remove the seedlings in the fall to rows three feet apart, and the plants two feet distant in the row. There they may stand until their comparative value can be determined.

VARIETIES

Black currants form quite a distinct class in appearance and flavor, and are not as popular with us as in England. They are stronger and coarser-growing plants than the red and white species, and do not require as high culture. They can be grown to advantage in tree form, as they are quite exempt from insect enemies. The tent caterpillar is the only one that I have seen injuring them. They also require much less pruning, since the best fruit is borne on the young wood of the previous year's growth. If they are grown as bushes, they need more room—six feet apart each way—and the knife need be used only to secure good form and space for air and light. Two native species—*Ribes*

floridum and *Ribes aureum*—are cultivated to some extent (for description see "Gray's Botany"). Although these species and their varieties are of little value, Mr. Fuller thinks that they might become the parents of far better kinds than we now have, since they are strong growers, and their fruit is naturally of better flavor than that of the European black currant. *Ribes aureum* is largely cultivated as an ornamental shrub, and its spicy-scented, bright yellow flowers of early spring are among my pleasantest memories. As has already been explained, we can make miniature trees of our white and red currants, by grafting them on its strong, erect-growing stems. *Ribes nigrum* is the European species, and is found wild throughout the northern part of the Eastern Hemisphere. Mr. Fuller writes that the inhabitants of Siberia make a beverage from its dried leaves which is said closely to resemble green tea. Black Naples is the finest variety of this species. Charles Downing says of it: "Its berries often measure nearly three-quarters of an inch in diameter. Its leaves and blossoms appear earlier than those of the common, or English Black, but the fruit is later, and the clusters as well as the berries are larger and more numerous." Lee's Prolific is said by some to be a slight improvement on the above; by others it is thought to be very similar.

Of red currants, the old Red Dutch is the most prominent. It is the currant of memory. From it was made the wine which our mothers and grandmothers felt that they could offer with perfect propriety to the minister. There are rural homes to-day in which the impression still lingers that it is a kind of temperance drink. From it is usually made the currant jelly without which no lady would think of keeping house in the country. One of the gravest questions in domestic economy is whether the jelly will "jell." Often it does not, and cannot be made to. The cause of its lamentable perversity is this: The currants have been left until over-ripe before picking, or they have been picked wet, just after rain. Gather them when dry, and as soon

as possible after they have turned red, and I am informed by the highest domestic authority (my wife) that there will be no difficulty.

In flavor, the Red Dutch is unequalled by any other red currant. It is also a variety that can scarcely be killed by abuse and neglect, and it responds so generously to high culture and rigorous pruning that it is an open question whether it cannot be made, after all, the most profitable for market, since it is so much more productive than the larger varieties, and can be made to approach them so nearly in size. Indeed, not a few are annually sold for Cherry currants.

The White Dutch is similar to the Red in the growth and character of the bush. The clusters, however, are a little shorter, and the fruit a little larger and sweeter, and is of a fine yellowish-white color, with a veined, translucent skin.

The White Grape is an advance in size upon the last-named, and of marvellous productiveness and beauty. It is not as vigorous as the White Dutch, and is more spreading in its mode of growth, requiring careful pruning to make a shapely bush. The fruit, also, is not spread so evenly over the wood, but is produced more in bunches. In flavor, it is one of the very best.

Dana's Transparent, and other white varieties, do not vary materially from either the White Grape or Dutch.

The great market currant is the Cherry. In the "Canadian Horticulturist" for September, 1878, I find the following:

"The history of this handsome currant is not without interest. Monsieur Adrienne Seneclause, a distinguished horticulturist in France, received it from Italy among a lot of other currants. He noticed the extraordinary size of the fruit, and gave it, in consequence, the name it yet bears. In the year 1843 it was fruited in the nursery of the Museum of Natural History, and figured from these samples in the

'Annales de Flore et de Pomone' for February, 1848. Dr. William W. Valk, of Flushing, Long Island, N. Y., introduced it to the notice of American fruit growers in 1846, having imported some of the plants in the spring of that year."

This variety is now very widely disseminated, and its culture is apparently becoming increasingly profitable every year. Two essentials are requisite to success with it—high manuring and skilful pruning. It has the tendency to produce long branches, on which there are but few buds. Rigorous cutting back, so as to cause branching joints and fruit spurs, should be practiced annually. The foliage is strong and coarse, and the fruit much more acid than the Dutch family; but size and beauty carry the market, and the Cherry can be made, by high culture, very large and beautiful.

Versailles, or *La Versaillaise*, is a figurative bone of contention. The horticultural doctors disagree so decidedly that the rest of us can, without presumption, think for ourselves. Mr. A. S. Fuller has probably given the subject more attention than any one else, and he asserts, without any hesitancy, that this so-called variety is identical with the Cherry. Mr. Fuller is certainly entitled to his opinion, for he obtained plants of the Cherry and Versailles from all the leading nurserymen in America, and imported them from the standard nurseries abroad, not only once, but repeatedly, yet could never get two distinct varieties. The writer in the "Canadian Horticulturist" also states in regard to the Versailles: "Some pains were taken to obtain this variety on different occasions, and from the most reliable sources, so that there might be no mistake as to the correctness of the name; but after many years of trial we are unable to perceive any decided variation, either in the quality of the fruit, the length of the bunch, or the habit of the plant, from the Cherry currant."

I must admit that I am inclined to take the same view;

for, during several years, I have looked in vain for two distinct varieties. I have carefully kept the two kinds separate, but find in each case the same stout, stocky, short-jointed, erect shoots that are often devoid of buds, and tend to become naked with age, and the same dark green, thick, bluntly and coarsely serrated foliage. Mr. Downing thinks the difference lies in the fact that, while the Versailles strain produces many short bunches like the Cherry, it also frequently bears clusters, and that such long, tapering clusters are never formed on the Cherry. This is the only difference, I think, if any exists; but in no instance have I been able to find this distinction well defined and sustained by the bearing plantations that I have seen. Mr. Downing, however, has had tenfold more experience than I have, and his opinions are entitled to corresponding weight.

That this class is much inclined to "sport," I think all will admit. One bush in a row may be loaded with fruit year after year, and the next one be comparatively barren. The clusters on one bush may be short and characteristic of the Cherry, while a neighboring bush in the same patch may show a tendency to mingle some long clusters with the short ones; and young bushes grown from the same plant will show these variations. I am satisfied that distinct and much improved strains could be developed by propagating from bushes producing the best and most abundant fruit, and that a variety having the characteristics of the Ideal Versailles could be developed. The importance of this careful selection in propagation can scarcely be overestimated, and the fruit grower who followed it up for a few years might almost double the productiveness and quality of many of his varieties.

Victoria (known also as May's Victoria, and having a half-dozen other synonymes) is a distinct variety, whose great value consists in its lengthening out the currant season two or three weeks after the above-named kinds have matured. The fruit is also large—between the Red Dutch and Cherry in size—exceedingly abundant, and although rather acid, of

good flavor when fully ripe. The clusters are very long—from five to seven inches—tapering, and the berries are bright red. If it is grown in some moist, cool, half-shady location, the bunches will hang on the bushes very late in the season. In many localities it is found very profitable, since it need not be sold until the others are out of the market. The young branches are rather slender, but the plant itself is vigorous, and can be grown at less expense than the Cherry.

There are many other named varieties, but in the majority of instances the distinctions between them are slight, and as they are waning before the finer varieties that I have described, I shall not attempt to lighten the shadows that are gathering around them. The future promises more than the past, and I think that, before many years pass, some fine new kinds will be introduced.

The enemies and diseases of the currant will be treated in a later chapter.

CHAPTER XXVII

GOOSEBERRIES

I HAVE treated the currant very fully, not only because it is the more popular fruit in this country, but also because the greater part of my suggestions under that heading applies equally to this branch of the *Ribes* tribe. Possessing the same general characteristics, it should be treated on the same principles that were seen to be applicable to the currant. It flourishes best in the same cool exposures, and is the better for partial shade. Even in the south of England the more tender-skinned varieties often scald in the sun. However, I would recommend the shade of a fence or a northern hillside, rather than overhanging branches of trees. A rich soil, especially one that is deep and moist but not wet, is equally requisite, and the rigorous annual pruning is even more essential. As the wood becomes old and black, it should be cut out altogether. Fruit buds and spurs are produced on wood two or more years old, and cutting back causes these, but they must not be allowed to become too crowded. To no fruit are air and light more essential.

We have in this country two very distinct classes of gooseberries—the first of foreign origin, and the second consisting of our native species. Gray thus describes *Ribes Grossularia*, garden or English gooseberry: "Cultivated from Europe for the well-known fruit; thorny and prickly, with small, obtuse, three to five lobed leaves, green flowers, one to three on short pedicels, bell-shaped calyx, and large berry."

This native of northern Europe and the forests of the British Islands has been developed into the superb varieties which have been famous so long in England, but which we are able to grow with very partial success. It remembers its birthplace even more strongly than the currant, and the almost invariable mildew of our gardens is the sign of its homesickness. The cool, moist climate of England just suits it, and it is the pride of the gardens of Lancashire to surpass the world in the development of large specimens. Mr. Downing writes:

"We are indebted to the Lancashire weavers, who seem to have taken it up as a hobby, for nearly all the surprisingly large sorts of modern date. Their annual shows exhibit this fruit in its greatest perfection, and a gooseberry book is published in Manchester every year, giving a list of all the prize sorts, etc."

The extraordinary pains taken is suggested by the following quotation from the "Encyclopædia of Gardening":

"To effect this increased size, every stimulant is applied that their ingenuity can suggest. They not only annually manure the soil richly, but also surround the plants with trenches of manure for the extremities of the roots to strike into, and form round the stem of each plant a basin, to be mulched, or manured, or watered, as may become necessary. When a root has extended too far from the stem, it is uncovered, and all the strongest leaders are shortened back nearly one-half of their length, and covered with fresh, marly loam, well manured. The effect of this pruning is to increase the number of fibres and spongioles, which form rapidly on the shortened roots, and strike out in all directions among the fresh, newly stirred loam, in search of nutriment."

This is carrying culture to an extreme rarely, if ever, seen in America. The annual referred to above recorded one hundred and fifty-five gooseberry exhibitions in 1863.

The number of varieties is almost endless, and more than seven hundred prize sorts are named in Lindley's "Guide to the Orchard"; but not one of them, I fear, can be grown in this country, except under favorable conditions and with extra care. Even after supplying such conditions, they will often mildew in spite of our best efforts. Again, in some localities, and for obscure causes, they will thrive and continue for years quite free from this chief enemy of the foreign gooseberry. Repeated applications of the flowers of sulphur over the bushes, from the time the fruit sets until it is ripe, are probably the best preventive. Thorough mulching, rigorous pruning, and high culture are also to be recommended. Those who garden for pleasure would do well to try some of these fine foreigners.

The following are some that Mr. Downing and others have recommended:

I. Red Varieties: British Crown, Top Sawyer, Roaring Lion, Lancashire Lad, Crown Bob.

II. White: Cheshire Lass, White Lion, Whitesmith, White Honey.

III. Green: Laurel, Heart of Oak, Jolly Angler, Jolly Tar.

IV. Yellow: Golden Fleece, Bunker Hill, Conqueror, etc.

If but two or three foreign berries are to be chosen, I would recommend Crown Bob, Roaring Lion, and Whitesmith.

I am sorry to say that seedlings of these foreign varieties have the same tendency to mildew shown by their parents. The Late Emerald was originated in the old garden at Newburgh, and is a sad example of this fact. For many years it thrived in its birthplace without a trace of mildew, but on my own place it has behaved so badly that I do not recommend it. Were it not for this fault, I should grow no other variety.

In view of this inveterate evil, mildew, which is so seldom escaped and so difficult to overcome, we must turn to

the second great class, our native species, since they are adapted to our climate. Of these there are several species, of which the following are the most prominent:

Ribes speciosum, showy, flowering gooseberry of California, cultivated for ornament, especially in England, and likely to succeed in the southern Middle States. It is trained like a climber; has small, shining leaves, very handsome flowers resembling those of a fuchsia, berry prickly, and few-seeded.

R. rotundifolium, more common in the West, is often downy-leaved; peduncles slender; the slender stamens and two-parted style longer than the narrow calyx; berry smooth.

R. cynosbati is found in the rocky woods of the North, is downy-leaved, with slender peduncle, stamens and undivided style not exceeding the broad calyx; large berry, usually prickly.

R. lacustre, Lake or Swamp Gooseberry, with the prickly stems of the gooseberry, but with a raceme of flowers like those of a currant; found in the cold bogs and wet woods of the North; small, bristly berries, of unpleasant flavor.

Last, but by no means the least, is the *Ribes hirtellum*, "commonest in our Eastern States, seldom downy, with very short thorns or none, very short peduncles, stamens and two-cleft style scarcely longer than the bell-shaped calyx; and the smooth berry is purple, small and sweet." (Gray.) This is the parent of the most widely known of our native varieties, the Houghton Seedling, named from its originator, Abel Houghton, of Lynn, Massachusetts. The bush is a vigorous grower, that will thrive, with decent culture, on any moderately good soil, and is very rarely injured by mildew. At the same time it improves greatly under high culture and pruning. The bush has a slender and even weeping habit of growth, and can be propagated readily by cuttings. From the Houghton have been grown two seedlings that now are justly the most popular.

The first and best of these is the Downing, originated

by Mr. Charles Downing of Newburgh. It is an "upright, vigorous-growing plant, very productive. Fruit somewhat larger than the Houghton, roundish-oval, whitish-green, with the rib veins distinct. Skin smooth. Flesh rather soft, juicy." I consider this the best and most profitable variety that can be generally grown in this country. In flavor, it is excellent. I have had good success with its whenever I have given it fair culture. It does not propagate readily from cuttings, and therefore I increase it usually by layering.

The second seedling is Smith's Improved, a comparatively new variety that is winning favor. It more closely resembles the Houghton in its habit of growth than the Downing, and yet is more vigorous and upright than its parent. The fruit is considerably larger than the Houghton, oval, light green, with a bloom, moderately firm, sweet and good.

Mountain Seedling, originating with the Shakers at Lebanon, New York, is the largest of the American varieties, but for some reason it does not gain in popularity.

Cluster, or American Red, is a variety of unknown origin. The ancestral bush may have been found in the woods. The fruit is scarcely as large as that of the Houghton, is darker in color when fully ripe, hangs long on the bush, and is sweet and good. Mr. P. Barry says that it never mildews. Therefore, it should be made one of the parents of new varieties, for in this direction lies the future of this fruit in America.

In support of this opinion, I am led to quote the following letter, recently received:

"I write to call your attention to a native variety of gooseberry, of which you make no mention in your 'Scribner Papers,' growing in great abundance in the Sierra Nevada, at an elevation of from 2,000 to 3,000 feet, often in the most exposed places, generally on northern slopes. Thinking it may not have come to your knowledge, I will

describe it. The bush is of stiff, erect habit, two to three feet high, a stocky grower and an abundant bearer. The berries vary from one-half to one and one-quarter inches in diameter, are covered with innumerable thorns, scarcely less savage in the green state than those on an ordinary wild bush of this country. When cooked, the prickles soften down to the same consistence as the skin, which is rather thick. When ripe, they are easily peeled, and well repay the trouble, the spines being then much less obdurate than when green. The mature fruit is of a deep, dull, coppery red color, and in flavor is equal, if not superior, to any of the *red* varieties which I have eaten in England. I have often wondered whether cultivation might not remove the spines from the berries, or, that failing, whether a seedling could not be raised from them which would give us a berry far more reliable than any good gooseberry we now have. The scorching sun of the long, dry season of California seemed to have no effect on the foliage, and in five years' experience I never found a mildewed berry.

"The berry is *round*, like the red English berries, instead of ellipsoid, like their white or golden ones.

"There is also another variety, hairy instead of spiny, about the size of your picture of the Downing; bush not so free a grower, rarely reaching two feet, and the berry, to my taste, much inferior. Tastes, however, differ, and it may be the more promising fruit.

"Both varieties are common throughout the eastern end of El Dorado, Placer, and Nevada counties."

The first-named, or thorny gooseberry, probably belongs to the *Ribes cynosbati*, and the latter to the *R. rotundifolium*. The writer is correct in thinking that, if such gooseberries are growing wild, cultivation and selection could secure vast improvements. When we remember that English gardeners started with a native species inferior to ours, we are led to believe that effort and skill like theirs will here be rewarded by kinds as superb, and as perfectly adapted to our climate.

CHAPTER XXVIII

DISEASES AND INSECT ENEMIES OF SMALL FRUITS

NATURE is very impartial. It is evidently her intention that we shall enjoy all the fruits for which we are willing to pay her price, in work, care, or skill but she seems equally bent on supplying the hateful white grub with strawberry roots, and currant worms with succulent foliage. Indeed, it might even appear that she had a leaning toward her small children, no matter how pestiferous they are. At any rate, under the present order of things, lordly man is often their servant, and they reap the reward of his labors.

Did not Nature stumble a little when man fell? She manages to keep on the right side of the poets and painters, for it would seem that they see her only when in moods that are smiling, serious, or grand. The scientist, too, she beguiles, by showing under the microscope how exquisitely she has fashioned some little embodiment of evil that may be the terror of a province, or the scourge of a continent. While the learned man is explaining how wonderfully its minute organs are formed, for mastication, assimilation, procreation, etc., practical people, who have their bread to earn, are impatiently wishing that the whole genus was under their heels, confident that the organs would become still more minute.

The horticulturist should be cast in heroic mold, for he not only must bear his part in the fight with moral wrong,

like other men, but must also cope with vegetable and insect evil. Weeds, bugs, worms, what hateful little vices many of them seem in nature! I do not wish to be thought indiscriminate. Many insects are harmless and beautiful; and, if harmless, no one can object if they are not pretty. Not a few are very useful, as, for instance, the little parasite of the cabbage worm. There is need of a general and unremitting crusade against our insect enemies; but it should be a discriminating war, for it is downright cruelty to kill a harmless creature, however small. Still, there are many pests that, like certain forms of evil, will destroy if not destroyed; and they have brought disaster and financial ruin to multitudes.

Mark Tapley hit upon the true philosophy of life, and it is usually possible to take a cheerful view of everything; such a view I suggest to the reader, in regard to the pests of the garden that often lead us into sympathy with the man who wished that there was "a form of sound words in the Prayer-Book which might be used in cases of great provocation." Under the present order of things, skill, industry, and prompt, vigilant action are rewarded. Humanity's besetting sin is laziness; but weeds and insects for months together make this vice wellnigh impossible, save to those who are so unfortunate as to live on the industry of others. Therefore, though our fruits often suffer, men are developed, and made more patient, energetic, resolute, persevering—in brief, more manly. Put the average man into a garden where there were no vegetable diseases, insects, and weeds to cope with, and he himself would become a weed. Moreover, it would seem that in those regions where Nature hinders men as much as she helps them, they are all the better for their difficulties, and their gardens also. Such skill and energy are developed that not only are the horticultural enemies vanquished, but they are often made the means of a richer and a fuller success.

In a valuable paper read before the New Jersey State Horticultural Society, and recently published in the

"American Entomologist," Mr. A. S. Fuller makes the following useful suggestions:

"Insects and diseases are frequently so closely united, or so dependent upon each other, that the naturalist often finds it difficult to determine to which the fruit grower should attribute his losses. Some species of insects attack only diseased or dead plants; others only the living and healthy. If a plant shows signs of failing, we are inclined to speak of it as being diseased, whether the failure is caused by a lack of some element in the soil, attacks of parasitic fungi, or noxious insects. The loss is the same in the end, whether from one or all of these enemies combined.

"There are two practical methods of combating insect enemies and diseases of plants; one is to so carefully cultivate and stimulate the growth of the plants that they may possess the power of resisting attack; the other is to make war directly upon them by artificial means. Of course, the first method is most applicable or practicable against the more minute species, such as the plant-lice, rust, smut, and mildew. I do not recommend forcing plants to extremes, in order to enable them to resist their enemies, as this might work an irreparable injury; but the condition to be aimed at should be a healthy, vigorous growth; for anything beyond this is more the sign of weakness than strength.

"The half-starved, overworked and uncared-for horse is sure, sooner or later, to become the prey of various kinds of internal and external parasites, which are thrown off, or successfully resisted in their attacks, by the healthy, vigorous, and well-fed animal; and the same principle holds good all through the animal and vegetable kingdoms—whether the subject be a man, horse, sturdy oak, or delicate strawberry plant. Not that all diseases are due to loss of vigor through starvation and neglect: but that a large number of them are is well known."

We all have seen these principles verified. In the Great American strawberry, I think, we have an example of feebleness resulting from over-stimulation. The Wilson Seedling, that, in the local vernacular, is sometimes said to be "running out," is, in contrast, the consequence of starvation, neglect, and long-continued propagation from poor, mixed stock. Feebleness can scarcely be called a disease, and yet it is best counteracted by the tonic treatment suggested by Mr. Fuller.

In loose, light soils, the Aphis, or Green Fly, often penetrates to the roots of strawberry plants in immense numbers, and they suck away life or vitality. The tonic of wood-ashes scattered over the rows will usually destroy the pests. Refuse from the tobacco-factory is also recommended.

I think that wood-ashes and bone-dust are excellent preventives of burning or sun-scalding. They give the plants such vigor that they are able to resist sudden or great climatic changes, from heat to cold, or from drought to moisture.

Many varieties are enfeebled by their disposition to run profusely. Kerr's Prolific, for example, will speedily sod the ground with small, puny plants, whose foliage will burn so badly that the fruit can scarcely mature. Set out these small plants, and give the tonic treatment of cutting off all runners, and large, bushy stools, with vigorous foliage and superb fruit, will result. Indeed, next to fertilizers and moisture, there is nothing that so enhances the vigor and productiveness of a plant as clipping the runners as fast as they appear. The uncurbed habit of running depletes almost like disease; and but few varieties will make large fruit buds and runners at the same time.

In close, wet weather the fruit and leaf stalks will sometimes suffer from mildew; and ocasionally a microscopic fungus, known as the strawberry brand, will attack the foliage. I have also seen, in a few instances, a disease that resembled the curl-leaf in raspberries. The plants were

dwarfed, foliage wrinkled and rusty, and fruit misshapen, like small, gnarly apples. In all such instances I believe in tonic treatment, of wood-ashes, bone-dust, guano, and fertilizers of like nature, used with care. Plants do not need over-doses or over-feeding any more than we do ourselves. When a few plants are diseased, I believe in rigorously rooting them out and burning them. If a field is affected, as soon as possible turn the plants under, and renovate the land with clover, buckwheat, a light dressing of lime, and thorough exposure to the air, light, and frost. By such methods, and a wise selection of fertilizers, I believe that strawberries can be raised on the same ground for centuries. My plants have always been exceptionally free from all kinds of disease or rust, and I attribute it to the liberal use of wood-ashes.

But there is one enemy that inspires me with fear and unmingled disgust. It is the type of a certain phase of character in society most difficult to deal with, and which the mantle of charity is rarely broad enough to cover—the stupidly and stolidly malignant, who have just sense enough to do a great deal of mischief, and to keep it hidden until too late for remedy. Science has dignified the detestable thing with a sonorous name, as usual—the *Lachnosterna Fusca*, already referred to. It does not deserve even its name in the common vernacular—White Grub; for its white is of a dingy hue, and its head dark, like its deeds. Has it a redeeming trait? "Give the de'il his due," says the proverb. The best I can say of the white grub is that crows, and an odorous animal I forbear to name, are very fond of it. This fact, I think, is its sole virtue, its one entry on the credit side; but there is a long, dark score against it. Of its havoc on the lawn and farm I will not speak, since it is sufficient for our purposes to state that it is the strawberry's worst foe.

The best method of circumventing the "varmint" is to learn its ways; and therefore I shall outline its history, beginning at a period in its being when stupidity predomi-

nates over its evil—that is, when it is the May beetle or June bug, that blunders and bumps around in utter disregard of itself and every one else. In this stage it is like the awkward village loafer, quiet by day, but active and obtrusive in the early evening. It dislikes honest sunshine, but is attracted by artificial light, at which it precipitates itself with the same lack of sense and reason that marks the loafer's gravitation toward a lighted groggery. Moreover, in the beetle phase, it is sure to appear at the most inopportune times and unsuitable places, creating the inevitable commotion which the blunder and tactless are born to make. As it whisks aimlessly around, it may hit the clergyman's nose in the most pathetic sentence of his sermon, or drop into the soprano's mouth at the supreme climax of her trill. Satan himself could scarcely produce a more complete absence of devotion than is often caused by these brainless creatures.

Because quiet by day, they are not out of mischief, as defoliated trees often prove. As midsummer approaches, they die off; but never until each female beetle has put into the ground about two hundred eggs, which never fail to hatch. The first year, the grubs are little, and, while they do all the harm they can, the small roots they destroy are not seriously missed by the plants. The second year, their ability keeps pace with their disposition, and they occasionally destroy strawberries by the acre. More often, certain patches of a field or garden are infested, and sometimes will be kept bare of plants in spite of all one can do. Too often, the presence of the grub is learned only after the mischief is complete. You may have petted a strawberry plant for a year, and after it has developed into noble proportions, and awakened the best expectations from its load of immature fruit, you will, perhaps, find it wilting some morning. You then learn, for the first time, that this insidious enemy has been at work for days, and that not a root is left. An inch or two beneath the dying plant, the grub lies gorged and quiet in the early morning; but

if undisturbed it soon seeks the next-best plant it can find, and it is so voracious that it is hard to compute the number it can destroy throughout the long season in which it works.

Having made its full growth in the spring of the third year, this grub passes into the chrysalis state, and in May or June comes out a perfect insect or beetle. It is "one, two, three, and out."

While there are beetles every year, there is, in every locality, a special crop every third year; in other words, if we observe beetles in great numbers during the coming May and June, we may expect them again in like quantities three years after; and every second year from such superabundance they will be very destructive in all those fields throughout the locality wherein the eggs were laid.

REMEDIES

When once our soil is full of them, scarcely any remedy is possible that year. Surface applications that would kill the grubs would also kill the plants. Where they are few and scattering, they can be dug out and killed. Sometimes boys are paid so much a pint. When seeing a wilting plant, it would scarcely be human nature not to dig out the pest and grind it under our heel. Prevention of the evil is usually our best hope. Mr. Downing writes to me: "I believe that if you would use refuse salt three or four years in succession, at the rate of five or six bushels to the acre, the grubs would not trouble you much. Salt will not kill the full-grown larvæ, but those in a very young state." The reader will remember a statement in Mr. Hale's letter on commercial fertilizers confirmatory of this view.

Experiments in this direction should be carefully made, since, in one instance that I am aware of, a fruit grower remarked, "I do not know whether the salt killed the grubs, but I know it killed my plants." It is my purpose, however, to try this agent very thoroughly. There is danger of our being misled in our estimate of the value of remedies, from forgetfulness of the habits of the insect. We find our

ground full of larvæ one year, and apply some cure or preventive. The following spring, the larvæ become beetles and fly away, and, even if they fill the same ground with eggs again, the grubs are too small to be noticed that year; and therefore we may claim that our remedy is effectual, when there may have been no effect from it whatever.

One of the best preventives is to keep the soil under cultivation, for this beetle rarely lays its eggs in loose soil, preferring old meadows and moist, loamy, sodded land; the larvæ are equally fond of grass roots. This is one of the reasons why a year or two of cultivation must often precede the planting of strawberries. When this fruit is grown in matted beds, they afford as attractive a place for the deposit of eggs as grass land; and this is another fact in favor of the narrow-row system and thorough cultivation.

Mr. Caywood, a nurseryman, says that he has prevented the approach of the grub by mixing a teaspoonful of sulphur in the soil just beneath a plant, when setting it out. Mr. Peter B. Mead recommends the pomace of the castor bean spread on the surface around the plants. I have never tried these preventives. One thing certainly might be done; exterminating war might be waged on the beetles. In the morning they are sluggish and easily caught; and in the evening we can treat them as whiskey venders do the loafers—burn them up. "Every female beetle killed heads off 200 grubs." If one could discover a complete remedy for this pest, he would deserve a statue in bronze. Mr. Fuller had a domesticated crow that would eat a hundred of these grubs daily. "When domesticated," he adds, "the crow forgets the tricks of his wild nature, and, not being a timid bird, he is not frightened by hoe or spade, but when the earth is turned over, is generally there to see and do his duty."

A fruit grower writes to Professor C. V. Riley: "I inclose specimens of a terrible pest on my strawberry vines. The leaves are almost entirely destroyed. I must fight them some way, or else give up the fruit entirely," etc.

In a letter to the "New York Tribune," Professor Riley replied:

"The insect referred to is the Strawberry Worm (*Emphytus maculatus*), the larva of a saw-fly, which is of quite frequent occurrence in the West. I quote the following account of it from my Ninth Report:

" 'Early in the spring numerous flies may be seen hanging to and flying about the vines in fields which have been previously affected. They are dull and inactive in the cool of the morning and evening, and at these hours are seldom noticed. They are of a pitchy black color, with two rows of large, transverse, dull, whitish spots upon the abdomen. The female, with the saw-like instrument peculiar to the insects of this family, deposits her eggs, by a most curious and interesting process, in the stems of the plants, clinging the while to the hairy substance by which these stems are covered.

" 'The eggs are white, opaque, and 0.03 of an inch long, and may be readily perceived upon splitting the stalk, though the outside orifice at which they were introduced is scarcely visible. They soon increase somewhat in bulk, causing a swelling of the stalk, and hatch in two weeks—more or less, according to the temperature; and during the early part of May the worms attract attention by the innumerable small holes they make in the leaves. Their colors are dirty yellow and gray-green, and when not feeding, they rest on the under side of the leaf, curled up in a spiral manner, the tail occupying the centre, and fall to the ground at the slightest disturbance. After changing their skin four times they become fully grown, when they measure about three-fourths of an inch.

" 'At this season they descend into the ground, and form a weak cocoon of earth, the inside being made smooth by a sort of gum. In this they soon change to pupæ, from which are produced a second breed of flies by the end of June and beginning of July. Under the influence of July

weather, the whole process of egg depositing, etc., is rapidly repeated, and the second brood of worms descend into the earth during the fore part of August, and form their cocoons; in which they remain in the caterpillar state through the fall, winter, and early spring months, till the middle of April following, when they become pupæ and flies again, as related.

" 'The remedy is the same as that employed against the currant worm, which belongs to the same family. It consists of white hellebore, used either in powder or liquid.' "

I think that tobacco dust or a strong decoction from the stems would prove effective, also.

I have never had any experience with this worm, but have read of instances in which fields had been entirely cleared of the pest by young chickens and turkeys.

The common little flea-beetle has often caused great injury to my recently planted beds. I once paid nearly $100 for a new, high-priced variety, and before I was aware of it every plant had been devoured. They rarely injure large, fully matured plants, but are often very destructive to those recently planted, especially if set during the summer. You can not catch them; for, as your hand approaches a leaf on which they cluster, they scatter with a sudden bound, and are at once lost to view, so nearly do they resemble the color of the ground. Slight dustings of dry wood-ashes impede their feeding somewhat; but I think we must cope with this insect as we do with the Colorado or potato beetle. It must be poisoned. Paris green, of course, will finish them speedily, but such a deadly poison must be used with great care, and if there is any green or ripe fruit on the vines, not used at all. Hellebore, London purple, tobacco dust, may destroy them; and when little chickens can be employed, they are a sure remedy.

"Black eyes," or the receptacle turning black, is caused by light frosts, to which the open flowers are very susceptible. If one's strawberry bed were in bloom, and there

was a prospect of a frosty night, I think the blossoms could be saved by covering the bed with four or five inches of straw or hay, and raking it off again as soon as the temperature rose sufficiently high in the morning.

Without doubt, new diseases and enemies to the strawberry will be developed in the future, and as they come we must experiment till we find some means of mastering them.

RASPBERRIES AND BLACKBERRIES

These two fruits are so near akin that they are subject to the attacks of the same diseases and enemies. The most fatal scourge of red raspberries that I have seen is what is called at Marlboro' the curl-leaf; and, if unchecked, it will eventually banish the famous Hudson River Antwerp from cultivation. As yet, no remedy has been found for it that I am aware of. I believe it to be contagious, and would advise that the plants be dug out and burned immediately, and that plantations of strong, healthy plants be made on new land that has never been in raspberries. I also suggest the free use of wood-ashes and well-decayed compost. As far as my experience goes, this disease is confined to foreign varieties, and almost wholly, as yet, to the Antwerps.

Mr. Fuller, in the paper already named, describes a disease among blackberries that resembles the raspberry curl-leaf so closely that it may be identical, and spring from the same cause.

"Some ten years ago, the cultivators of the lackberry in various parts of New Jersey noticed that the ends of the young, growing canes, in summer, would occasionally curl, twist about, and often assume a singular, fasciated form, resulting in an entire check to their growth. The leaves on these infested shoots did not die and fall off, but merely curled up, sometimes assuming a deeper green than the healthy leaves on the same stalk. At the approach of winter, the infested leaves remained firmly attached to the diseased stems; and all through the cold weather, and far into

the spring, these leaf-laden and diseased stems were a conspicuous object in many of the blackberry plantations of this State.

"If the infested shoots are examined in summer, thousands of minute insects, of a pale yellow color, and covered with a powdery exudation, will be found sucking the juices of the succulent stem and leaves, causing the crimping, curling, and twisting of these parts as described.

"This parasite resembles somewhat an ordinary green-fly (*Aphis*) or plant louse; but, according to the observations of Professor Riley, it belongs to the closely allied Flea-lice family (*Psyllidæ*), distinguished from the plant-lice by a different veining of the wings, and by the antennæ being knobbed at the tip, like those of the butterfly, the knob usually terminating in two bristles. These insects jump as briskly as a flea, from which characteristic they derive their scientific name. The particular species in question was called by Professor Riley the 'Bramble-Flea-louse (*Psylla rubi*[1]),' in the American Entomologist (Vol. I., p. 225). It has increased rapidly during the past half-dozen years or more, and unless fruit-growers make a more vigorous fight than they have yet done, it will soon get the mastery of many blackberry plantations. The only practical method as yet discovered for checking the ravages of this insect is to cut off the ends of the infested canes and burn them. This operation should always be performed either in the morning or during cool, wet weather, else many of the insects will escape; and at all times the severed shoots should be immediately dropped into bags, and in them carried to the place where they are to be burned, and there emptied into the fire. If every one having blackberry bushes in their gardens would practice this method of destruction, this pest would soon cease to do much harm."

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[1] "It can not be distinguished from *Psylla tripunctata*, Fitch (Catalogue of Homoptera, etc.), and, what is most singular, the same species is very common on pine-trees all over the eastern part of the continent, from Florida to Canada."

There are species of borers and gall insects that attack these two fruits, but as yet they have not become formidable. All infested canes should be cut out and burned with their contents, or else the pests may so increase as to cause much injury.

The larvæ of the *Selandria rubi*, an insect nearly related to the imported currant worm, and known as the raspberry saw-fly, is destructive in some regions. It is semi-transparent, and so like the foliage in color that it could scarcely be detected, did not the ragged, perforated leaves indicate both its presence and its mischief. This worm measures half an inch in length, when fully developed. It has two black eyes, like spots, upon a green head, and usually a slightly fuzzy body. The remedies recommended are the same as those used against the currant worm. I have had no experience with this pest.

The Orange-rust (*Uredo rubrum*) is one of the worst of foes to both the blackberry and raspberry—the *Rubus occidentalis*, or black-cap family, suffering the most, usually. I have seen fields of the Early Wilson and Kittatinny blackberries in New Jersey that presented a melancholy appearance. It is believed to be very contagious, and it can be spread by both trimmer and pickers. Mr. Chas. A. Green, of Monroe County, N. Y., writes: "The end plant of a row in my garden was affected, and I let it remain, as an experiment. In three years, nearly every plant in the row was more or less diseased. We have tried picking the leaves and cutting back the canes, without relief, and have found that the only safe method is to dig out and destroy all affected plants without delay." Mr. Fuller says that "application of lime, salt, or some similar substance, may check the disease; but I know of no remedy except that of rooting up every affected plant, and burning it." Mr. Downing recommends the same course. It is one of those evils that should be stamped out at once. If a plantation were generally affected with this yellow symbol of contagion, it would be well to destroy all the plants,

and, obtaining new, healthful stock from a distance, start again on different grounds. Should the snowy tree-cricket become very abundant, it might cause much injury, chiefly by cutting off the leaves, as the ordinary cut-worm serves the stem of a young plant.

CURRANTS AND GOOSEBERRIES

We have not only imported our best currants from Europe, but also their worst enemies. The most formidable of these is popularly known as the currant worm. Robert Thompson, the English authority, thus describes it: "The magpie moth (*Abraxas grossulariata*) deposits its eggs upon the foliage, and from them is hatched a slightly hairy cream-colored caterpillar, spotted with black, and marked with orange along the sides, and which forms a loop in walking. It feeds upon the leaves, devouring all but the petiole, and often entirely defoliating both gooseberry and currant bushes. It changes into a pupa in May or June, and in about three weeks afterward, the perfect insect makes its appearance." Very naturally, this currant worm made its debut near Rochester, N. Y., a great fruit centre, receiving annually large importations of plants. Its first appearance was in 1857.

In England, the caterpillar of the *Phalæna vanaria*, a similar insect, is often destructive. Whether it has appeared among us yet, I am not informed. They fight it abroad as they do the ordinary worm.

The gooseberry and currant saw-fly (*Nematus ribesii*), another pestiferous foreigner, has made its appearance in some localities.

We have, besides, a native saw-fly (*Pristiphera grossulariæ*), which resembles its European congener, and emulates it in mischief. The larva of this fly feeds upon both the currant and the gooseberry, but prefers the latter.

Nature is liberal, and has given us, in addition, a native gooseberry span-worm, the larva of a small moth. These several worms, unchecked, would soon render the culture

of the currant and gooseberry impossible in the regions where they abounded; and, at first, horticulturists were almost in despair, for the pests seemed proof against the usual insecticides and means of destruction. It was eventually discovered that powdered white hellebore was a specific remedy. Usually, it is applied unmixed with other substances; and pains should be taken to get a genuine article, or else it will not destroy the worms.

Mr. H. T. Jones, of Rochester, recommends the following:

"To one pailful of wood-ashes, add one quart each of white hellebore and flowers of sulphur; mix thoroughly; apply by sifting on the bushes while the dew is on them. I used nothing else on my plantation of over two acres last season, and want nothing better; but it must be used *daily* as long as any worms are seen."

I have heard that, if applied in a liquid form, a heaping table-spoonful of hellebore to a gallon of water is a good proportion.

At the meeting of the New Jersey Historical Society, it was stated by good authorities, as the result of actual experience, that tobacco-dust would kill the worms as readily as hellebore. I hope this is true, since the latter is expensive when applied on a large scale, and the tobacco-dust can be bought at from two dollars to three dollars per barrel. I shall try it next year.

I also quote the following from a recent editorial by Mr. Fuller, in the New York "Weekly Sun:"

"White hellebore has long been considered one of the most efficacious of all poisons for the imported currant worm, but a New Jersey fruit-grower of considerable experience informed us not long ago that he had found strong tobacco water quite as good as the hellebore, and it was also soon washed off by heavy rains, whereby the fruit was not rendered unfit for use, as when other and more virulent

poisons are employed. To make a strong solution, put a half-bushel or bushel of tobacco stems, or even the leaves, into a cask or barrel, and press down and hold in place with a stone or other weight; then pour on hot water enough to cover the tobacco, and leave it for a few days to steep. After steeping, the cask may be filled up with warm or cold water, and the solution is ready for use. If a half-pound or pound of crude potash is added, or a quart or two of soft soap is stirred in, the solution will be much improved, especially in its destructive properties. After using the first liquid, the barrels may be filled again with water, and left to steep a few days longer than the first time, or some fresh tobacco may be added, to give the solution the required strength. Tobacco water is certainly a cheap insecticide, and will frequently be found quite as efficacious as those that are more costly and troublesome to apply."

A gentleman from Erie, Pa., writes to me that he has used this remedy for years, with complete success.

Mr. J. McK. Beattie, of Pictou, Nova Scotia, has written to me of a still simpler method:

"I notice in the April number of 'Scribner's Monthly' that you intend to use tobacco-dust to destroy the currant worms. It will prove effectual; but as I can give you a far more simple plan, I take the liberty of writing. It is one which I have proved for the past seven years, and never have known it to fail wherever tried.

"After digging about my bushes, and manuring in the spring, I cover the earth around the bushes with tobacco stems, and place a handful in the middle of the bush, and the work is done for the season. I found that when using the dust I had to renew it after every heavy rain, whereas the stems did not need renewing, unless it was a very wet season, and then, if any worms appeared, a handful of fresh stems scattered through the bushes made them disappear.

"The stems have several advantages: they are cheaper than dust; they serve as a mulch to keep the ground off the

fruit; and when dug in about the bush, they make an excellent manure. I think if you once gave them a fair trial you would never be tempted to try any other method.

"Last year stems were very scarce here, and I could not get enough to mulch all my bushes, so I only put a generous handful in the centre of a good many bushes, and they were not troubled; but I would not like to recommend that plan until I experimented further."

For the past two years the worm has attacked my bushes savagely; but, as I am very fond of currants, and relish white, powdered sugar more than hellebore, I fought the pests successfully by hand-picking. I kept a boy, at moderate wages, whose business it was to kill insects and worms. He had a lively time of it occasionally, for Nature sometimes appeared to take sides with the pests.

The cautious use of lime and salt around and under the bushes might prove beneficial, since the worm descends into the soil before changing into a pupa.

The current and gooseberry are also infested with several species of plant-lice. A gentleman whose bushes were attacked by lice and the currant worm at the same time, wrote to the "Country Gentleman" that he destroyed both by a strong decoction of white hellebore, applied from a fine rose-sprinkling can. The bushes were turned back and forth, so as to get the solution on the under side of the leaves. The writer concludes:

"The decoction of hellebore must be strong to be effectual. I make it as follows: To a gallon of boiling water add a tablespoonful of pulverized hellebore. After standing fifteen or twenty minutes, add three gallons of common soapsuds. When cool, apply with a sprinkler. I do not know that there is any virtue in the soapsuds, excepting it makes the solution stick to the leaves."

There are three species of currant borers with unpronounceable names. Their presence is shown by yellow

foliage and withering fruit in summer, and by brown, shrivelled branches in winter. Cutting out and burning is the only remedy. Usually, a vigorous bush will outgrow the attacks of this enemy; and good cultivation gives vigor, and also disturbs and brings to the surface the worms that have entered the soil to undergo their transformation. From first to last, tonic treatment supplements and renders more effective our direct efforts to destroy diseases and enemies.

Most earnestly would I urge caution in using all virulent poisons like Paris green, London purple, hellebore, etc.

Whenever it is possible to substitute a less poisonous substance, do so by all means. Some good people regard tobacco as the bane of banes; but to many it does not cause the feeling of repugnance and fear inspired by hellebore and more poisonous insecticides. Let all such articles be kept under lock and key; and one person should have charge of their use, and be held responsible for them. Moreover, any watering-can used with Paris green and like substances should be marked with the word *Poison*, in large letters. If insecticides are used in the form of a powder, great care should be exercised to keep it from falling on other vegetation or fruit that might be eaten by man or beast. I have known of pigs and horses dying from eating herbage on which Paris green had blown from a potato field. London purple, which, as a cheaper and equally effective article, is taking the place of Paris green, must be used with the same caution, since it is a compound of arsenic, and equally poisonous.

It is my wish and intention to experiment carefully with the various means and methods of coping with the diseases and enemies of small fruits, and to give this chapter frequent revisions.

CHAPTER XXIX

PICKING AND MARKETING

IN the proceedings of the New Jersey State Horticultural Society, I find the following interesting paper from the pen of Mr. C. W. Idell, a commission merchant, whose intelligent interest in fruits extends beyond their current price. He gives so graphic a picture of the diminutive beginning of small fruit growing and marketing, that I am led to quote freely:

"About the earliest knowledge I could obtain of the strawberry in our State is that it first grew wild in many regions, particularly in the county of Bergen. The negroes were the first to pick this fruit for the New York market, and invented those quaint old-fashioned splint baskets, with handles, that were and are still in use in that county. These berries were taken to New York, the baskets being strung on poles, and thus peddled through the city. I would state, for the benefit of those who have not seen these baskets, that it was the intention of the original makers of them to have them contain a half-pint each, but soon they became so reduced in size that each buyer was compelled to guess at the contents of those he bought.

"Just when cultivated berries made their appearance, I am unable to say, but I am inclined to think they were derived from seedlings of the wild fruit. From the information I have gathered, I think that the cultivation of the fruit for the market originated in the vicinity of Hackensack, Bergen county, and from there spread over the State.

As there were no railroads in that section at that early date, all the berries had to be carted to New York in wagons, crossing the Hudson at Hoboken. Quite recently I met with Mr. Andrew M. Hopper, of Pascack, who gave me several interesting points from his early recollections.

"Mr. Hopper said: 'I am sixty-five years old, and can well remember picking berries for my father, when a boy ten years of age. At that time we had no crates as we have now, but packed them in large baskets that we called hampers.

" 'Our only shipping point to New York was Piermont, on the Hudson, New York State, a distance of about eight miles.

" 'At this point there was a line of sloops that sailed semi-weekly, when wind and tide permitted. In those days there were no commission merchants in New York that dealt in berries, and each farmer was compelled to go with and sell his own fruit. The fare on these vessels was one shilling for a round trip, board not included; and as it sometimes required two days to reach the city, each farmer provided a lunch for himself before starting from home, as well as provender for his team, which was left at the landing to await his return. The usual fee for caring for the team while they were gone was twenty-five cents.'

"The Hautbois was the first named variety he could remember, which was introduced among them in 1835. In about 1840 the Scotch Runner was introduced at Hackensack. It was a valuable variety for the growers, as it was hardy, a good bearer, and the fruit grew unusually large for that period. An incident connected with the introduction of this variety is worth mentioning, showing the eagerness of the cultivators to procure the plants.

"A gentleman living at 'Old Bridge,' which is a few miles above Hackensack, secured quite a number of plants and set them out in his garden for the purpose of propagating them, so that he could in due time plant a large patch of them. The vines being in great demand, his neigh-

bors insisted upon his selling them; but this proposition he positively refused, and the consequence was that, one night, some person entered his garden and stole every plant he had. At this period and up to the introduction of the Wilson, all strawberries in that section were picked and marketed without the hulls.

"For a long time I have been trying to find out the originator of the quart-berry-box and crate, and, thinking Mr. Hopper might possess some knowledge on this point, I inquired of him. He replied: 'I know nothing about the quart box, for I never used them, but I do about the crate.

" 'In 1840 I made the first crate ever used in our section, if not in the State, and I will tell you how I came to do it. In those days I raised large quantities of apricots, and marketed them in such baskets as we happened to have. In the year named my fruit was very large and finely colored, and knowing they would be damaged by carting in the usual way, I had a number of small baskets made, and then I constructed a crate to fit them. The next day after I made them, Gen. Acker, who was an old fruit grower, called on me, admired the arrangement, and suggested that they would answer to pack berries in, and requested me to make two for him, which I did. From these the use of them became general.'

"The cases referred to were skeleton cases, some with and others without lids, each grower making them to suit his own convenience for handling; but they generally contained from one to two hundred baskets each. The number of baskets in each was marked either on the lid or slat."

From the above quotation, the reader can realize what vast changes have taken place within the last fifty years. A few sable pedlers, with little baskets strung on poles, form a decided contrast with a Charleston steamer, bringing in one trip North far more strawberries, in patent refrigerators, than were then sold in a year; or with an Old Dominion steamship, discharging six thousand bushels as

a single item of cargo. Ninety-four car-loads of strawberries have passed over the Delaware railroad in one day. According to one computation already given, New York consumes $25,000,000 worth of small fruits annually. If the business has grown to such proportions within the last half-century, may we not expect even greater increase in the future? The appliances for preserving fruit, and for transporting it quickly and safely, become more perfect every year. Thus a market is created in vast regions which, though populous, are not adapted to the raising of fruit.

The modern conditions of marketing fruit are just the reverse of those described by Mr. Idell. Then the berries, both in size and quantity, were small; but the labor and difficulty in reaching the consumer were immense. Now, strawberries that in size resemble tomatoes can be forwarded by the ship and car load, with brief printed labels, and the commission merchant sells for his correspondent, who may reside hundreds of miles away, and for years never follow his fruits to their market. Our chief ground for solicitude is success in finding a commission house able to dispose of our fruit promptly at current rates, and sufficiently honest to make exact returns at the end of each week. There are many who do this, and not a few who do not. If one has not satisfactory business acquaintance in the city, I suggest that they learn from their neighbors who have been in the habit of shipping produce, the names of merchants that uniformly have made the best returns. Moreover, it is often well, if one has considerable fruit, to ship to two or more parties, and compare prices. The homely proverb hinting that it is not wise to put all our eggs in one basket, is sound.

FRUIT PACKAGES

My experience and observation have led me to market my strawberries in square quart baskets, and round pints, and raspberries in half-pints; although pints answer equally well for a firm raspberry, like the Cuthbert or Brandywine.

If I were shipping long distances, I would prefer baskets

of which the round Beecher quarts and pints are the types. Such packages occupy too much space, however, to be forwarded in refrigerators. I think berries remain in good condition longer in this circular, open basket than in any other. Of the crate, it is sufficient to say that it should be light, strong, and so constructed as to permit free circulation of air. Few of the square "quart baskets" hold a quart. Indeed, there are but few honest baskets in the market; and the fact has come to be so well recognized that they are now sold by the "basket," the majority being aware that they are simply packages of fruit. I think there should be a change in this respect, and that the several packages should hold a full quart, pint, etc. Square quarts fill a crate compactly, requiring the least amount of space; there is no chance for the baskets to upset, and when the crate is opened there is a continuous surface of fruit, which is very attractive. Very large, showy strawberries appear best, however, in round baskets. If my market were a near one, I would plan to dispose of the bulk of my crop in round pints, since they could be used for strawberries, the firmer raspberries, and blackberries. Thus one stock and style of baskets would last throughout the whole season.

A little good taste bestowed upon the appearance of a fruit package often adds several cents per pound or quart to the price received, and thus it comes that the brand of certain growers is sought after in the market. A few green leaves, judiciously placed, cost nothing, but may catch the eye and secure a fancy price.

After much inquiry in the market, however, I am led to the conclusion that the size, quality, and appearance of the fruit count for far more than all other considerations combined.

The old Marlboro' thirds, still largely in use on the Hudson, should be superseded as soon as possible by baskets that permit circulation of air. We should use boxes cheap enough to be given away with the fruit. There is a box of this kind, called the "Sunnyside fruit-box," which can be

obtained for about $10 per 1,000. The purchaser sees a pretty box of fruit at a shop, buys and takes it with him, and is at no trouble to return the box. The present frequent practice of pouring the fruit into brown-paper bags is villanous.

Mr J. T. Budd, of Wilmington, Del., in a sensible letter, gives several excellent reasons why it would be better, and, in the end, cheaper, to use such cheap crates and baskets that one could afford to let them go with the fruit. The expenses of transportation would thus be reduced, and the prices of the berries enhanced, not only because the purchaser would not have the trouble of returning packages, but chiefly for the reason that the fruit would always appear in fresh, new baskets, instead of those soiled, and often musty, from long use. Mr. Budd shows that, in Delaware, crates and baskets could be made sufficiently cheap for this practice.

PICKING

Having procured the baskets which suit us best, the next thing is to fill them properly, and get them into market looking fresh and attractive. It is just at this point that very many wrong themselves, or permit themselves to be wronged. The time is past when all strawberries will sell as such, at so much per quart. Appearance often doubles the price, or makes it difficult to sell the fruit at all. Soiled, muddy berries, even though large, will fetch but wretched prices; therefore the importance of mulching. The fruit may be in beautiful condition upon the vines and yet be spoiled by careless picking. The work is often performed by children, or by those who have had no experience, or who, from inherent shiftlessness, do everything in the worst possible way. I have seen beautiful berries that in their brief transit through grimy hands lost half their value. Many pickers will lay hold of the soft berry itself and pinch it as they pull it off; then, instead of dropping it into the basket, they will hold it in the hand as they pick others, and as the hand grows fuller, will squeeze them tighter,

and when, at last, the half-crushed handful is dropped into the basket, the berries are almost ruined for market purposes. Not for $10 per day would I permit such a person to pick for me, for he not only takes fifty per cent from the price of the fruit, but gives my brand a bad reputation. If possible, the grower should carefully select his pickers, and have them subscribe to a few plain rules, like the following:

1. Each berry must be picked with the thumb and forefinger nails, and not held in the hand, but dropped into the basket at once.
2. No green, decayed, or muddy berries will be received.
3. There must be no getting down upon all fours in the beds, thus crushing both green and ripe fruit.
4. There must be no "topping off" with large berries, but the fruit must be equally good all through the basket.

In the early pickings of Wilsons, when many of the berries are of good size, and of all the large, choice kinds, it is best to make two grades, putting the large and small by themselves, and keeping varieties separate. A small frame, with short legs at the corners, and a handle, is a convenient appliance to hold six or more baskets while picking. Give to each picker two sets of baskets, one for the small and one for the large berries, and pay equally for both, or perhaps a little more for the small ones, so that there may be no motive to thwart your purpose; one and a half to two cents per quart is the usual price. Have two styles of tickets, red and blue, for instance; the red having a higher value and being given to those who bring the berries to the place of packing in good order, acording to rule; let the baskets not picked in conformity to the rules be receipted for with the blue tickets. Receiving many of the latter soon becomes a kind of disgrace, and thus you appeal to the principle of self-respect as well as self-interest. Get rid of those who persist in careless picking as soon as possible. Insist that the baskets be full and rounded up, and the fruit equal in quality down to the bottom. As far as possible, let the hulls be down out of sight, and only the fruit showing. If you have berries that are extra fine, it will pay you to pick and pack them your-

self, or have some one to do it who can be depended upon. Do not pick the fruit, if you can help it, when it is wet with dew or rain; still, there are times when this must be done to save it. Never let the baskets or crates stand long in the sun and wind, as the berries so treated soon become dull and faded. As soon as a crate is filled, put it under cover in a cool place till shipped to market. As far as possible, insist upon careful, gentle handling.

Raspberries should be treated with even greater care than strawberries, since they are softer and more perishable. They should never be put into anything larger than a pint basket, while thirds of a quart and half-pints are much better. Round half-pints seem to be coming into favor. There is a wide, shallow basket made in Rochester, that some growers think highly of. With most varieties of raspberries, if any considerable number are placed together they soon become a soft, mouldy mass. The ideal raspberry basket, therefore, is small, open, and shallow; and the crates should permit free circulation. Pick the fruit when dry, and as soon as it is ripe, as over-ripe berries decay quickly. Keep varieties by themselves. Mr. Parry says that raspberries will pay at ten cents per quart, but the margin of profit will be small. They usually sell at much higher figures. Black-caps of late years have scarcely brought paying prices in New York market. The following statement shows what a difference variety, and therefore quality, makes in the same market. On the 7th day of July, 1871, raspberries were sold at wholesale, in Philadelphia, as follows, viz.:

Black-cap	5	cents per quart.
Philadelphia	8	"
Pearl	16	"
Susqueco, or Brandywine	30	"
Hornet	60	"

Blackberries sell well in both quart and pint baskets, but if one is sending a long distance, pints will carry the fruit in better condition.

One of the best methods of shipping currants is to have tills, or shallow boxes, two or three in number, fitting in one's berry crates, which can thus be made to serve a double purpose. Mark on these tills the net weight of the fruit. For large, Cherry currants, quart and verbena baskets are often used. Many like a long market basket, holding about twenty-five pounds, while those who raise grapes often make the same shallow boxes answer for both.

Gooseberries are shipped in all kinds of packages, from barrels to quart boxes. I prefer a crate with tills, for both gooseberries and currants. These two fruits, especially the latter, are becoming increasingly profitable every year.

In summing up, it may be briefly stated that with all fruits, and in all the large markets, beauty, size, and good keeping qualities are the points which are chiefly considered. Very few know much about the names of varieties, but eagerly purchase that which appears the most attractive. The grower who can make his crates of berries, when opened, look better than others near, will always receive good prices. If he tops off poor fruit with large berries, he will scarcely find a market eventually. If he always fills his baskets *well* and *honestly*, and gives good weight, taking pains to make his packages appear attractive, his fruit will soon be in much demand and spoken for in advance.

CHAPTER XXX

IRRIGATION

THIS is a topic on which a book might be written. The reader will draw a sigh of relief, however, on learning that I shall content myself with giving a few facts and suggestions, since I am well aware that, in spite of its title, this chapter will be dry to many.

The first rays that fall from the lamp of history reveal vast systems of irrigation in full operation. In many parts of the globe artificial watering is absolutely essential, and there are few agricultural regions which might not be rendered far more productive if the supply of moisture could be regulated in accordance with the needs of each crop.

The question, as we shall consider it, is a practical one. In California and other sections, the land *must* be irrigated; here, and wherever the rainfall is more equally distributed throughout the year, we *can* water if we find the practice remunerative.

The increased yield from the proper application of water is often marvellous. Mr. James Neilson, in a paper read before the New Jersey State Board of Agriculture, gives some interesting facts observed abroad. In regions along the Cavour Canal, the people were able to mow in one season six heavy burdens of grass, and in the vicinity of Edinburgh, by the use of sewage water, five or six crops of grass annually. In Belgium, "sandy, barren land (resembling the pine barrens of New Jersey) was put into profitable cultivation when it could be irrigated." The plain of Gennevilliers, near Paris, seemed utterly worth-

less for cultivation. It consisted almost wholly of coarse gravel, and bore no rent. No land owner would make any effort to use water, so the city of Paris bought about twenty-five acres and turned upon it part of the sewage. It now rents for nearly $50 per acre, with sewage supplied. In parts of Spain, land is worth $2,500 irrigated, and but $125 without the privilege of water.

The enormous and long-continued crops of strawberries raised in California prove that water is equally effective in our new land, where the climate is similar, as in the older countries. Will irrigation pay in our latitude, where we hope for seasonable rains? I think that in many sections it will, and occasionally I hear of remarkable results obtained by the free use of water. In one instance a gravelly hillside, almost worthless for ordinary cultivation, became the wonder of the neighborhood, so large were the crops of strawberries secured by irrigation.

Mr. Chas. W. Garfield, Secretary of the Michigan State Pomological Society, gives an interesting account of his visit to Mr. Dunkley, a successful gardener, at Kalamazoo: "A force," he writes, "were picking strawberries from rows of vigorous plants, and as we opened the vines in advance of the pickers, a more delightful strawberry prospect we had never seen. The varieties were Monarch, Seneca Chief, and Wilson, and under the system of irrigation employed they were just prime for market, after all the other berries in the vicinity had ripened and were gone. Very remunerative prices were thus secured. His vines were vigorous and independent of the rains. Every berry that set reached perfection in size and form." The abundant moisture greatly increases the size of the fruit, but retards the ripening. When the fruit has reached the proper stage for maturity, the water is withheld, and then the berries ripen fast, but in their perfect development are firm, and are shielded from the sun by the luxuriant foliage. "We water," said Mr. Dunkley, "only to supplement the rain. If the season is wet, we employ our artificial system but

little, or not at all, and in such seasons get no profit from our investments; but generally, sometime during a season there is a drought that shortens some crop; then we irrigate, and have the advantage of neighboring gardeners."

This statement suggests the practical question, Do droughts or dry seasons occur with sufficient frequency to warrant the outlay required for irrigation? In a very interesting paper read before the Massachusetts Horticultural Society, Mr. W. D. Philbrick gives much information on the subject of artificial watering, and its need in our latitude and section, and I quote from him freely:

"The amount of water required will depend largely on the rainfall, velocity of the wind, atmospheric humidity, soil, etc. A loose, sandy soil will require much more water than a retentive clay. In general, however, it may be assumed that in the warm, growing months of May, June, July, August and September, most vegetation requires an inch in depth over the entire surface of the land every five days. This is, of course, only an *average*. This quantity, estimated as needed by our gardens, would be equivalent to six inches per month of rainfall. If we compare this amount with the actual rainfall, we shall arrive at an idea of what is to be supplied artificially.

"The rainfall at Boston for the past six years (to 1878), for the five growing months named, varies from a maximum of 10½ inches, in August, 1872, to a minimum of 0.65 inch, in June, 1873. During these six years there was not a single season when we did not suffer more or less from drought during some portion of the summer. Twenty-one of the thirty months in question had less rainfall than six inches per month, and the average of these twenty-one months was about 3.02 inches per month, or only about half of what was needed. Some of the protracted seasons of drought were almost entirely rainless for six weeks, during which the weather was excessively hot and windy, and vegetation suffered extremely in consequence."

Mr. Philbrick estimates that 27,000 gallons, or 108 tons, of water are needed per acre at each watering, which, in a dry period, should be repeated every five days. This enormous quantity leads him to suggest that—

"before embarking in an enterprise of irrigation, it would be best to make sure that the source can be depended upon for a sufficient supply of water in the driest seasons; for it is precisely at such times that the most water is needed. Ordinary springs and wells, therefore, are entirely inadequate to furnish water for anything more than a small patch or garden. The only sources to be depended upon for large areas are unfailing streams, lakes, and ponds. There are few gardens so favorably situated that the water can be drawn from canals and ditches directly from some pond or stream. When this can be done it is by far the cheapest method; and it is in this way that the extensive irrigating works of Lombardy, Spain, France, California, and Colorado are constructed. Where this system is adopted, considerable expense is required to grade the land into inclined beds, so as to distribute the water easily and evenly; but, once done, the water is applied at a very trifling cost—so cheaply that it is used for farm crops in Lombardy and the South of France."

In most instances, however, our land is so located that we cannot irrigate it by a natural flow and fall of water. In this case, it may be distributed by water-carts and by hand. This can be done only on a very small scale. The cost in time and labor would be much too great for profitable returns, and the ground would be so beaten and trampled as to cause much injury. Such methods may answer very well for small and well-mulched fruit gardens, making the home supply certain and large, but it is inadequate from a business point of view. Distributing water through pipes laid underground, beneath the plow, does not work well at all, practically, and is not in accordance with nature. Most of the water is wasted.

Mr. Philbrick continues:

"The only method of distributing water much used in gardens where pumping is practiced is the system of iron pipes laid underground, with hydrants distant 200 feet asunder, from which the water is distributed by 100 feet of India rubber hose. This is also the plan adopted by gardeners who make use of the public water supply."

When practicable, such iron pipes should be carried along ridges and headlands, so as to let the water flow where we wish it by gravity as far as possible.

"Where the water has to be distributed by hose and sprinkler it will be found good economy to use a powerful pump, that will give a head of at least thirty feet, and to use for distribution pipes of not less than one and a half inches in diameter; provided, of course, that any considerable area—an acre or more—is to be watered. Thus, for example, we will suppose that it is required to water five acres of land, and that we have near by a never-failing pond or river; we can locate a steam pump near the river, and, while at work watering, we load the safety-valve upon the delivering water pipe at fifteen pounds per square inch, which corresponds to a head of about thirty feet of water. We have 300 feet of iron pipe, two inches in diameter, and 100 feet of India rubber hose, one and a half inches in diameter, for the delivery of the water. This apparatus would be capable of delivering 45 gallons per minute, or 27,000 gallons per day of ten hours—enough for the thorough wetting of one acre per day, or every acre of the five once in five days; by running nights, ten acres could be watered.

"When only a limited area is to be watered—less than an acre—the wind-mill furnishes a cheaper source of power than the steam pump. To make it available, large storage of water must be provided at a high level, so that the mill may work during stormy weather and store the water until needed. A wind-mill, costing with pump and tank about

$500, will furnish water enough for one or two acres of land, provided storage can be provided for 200,000 gallons of water. To provide this storage might cost as much as a steam pump. Where elevated reservoirs can easily be made, and the amount of water needed is not over 10,000 gallons daily, the wind-mill is, without doubt, cheaper power than steam."

Mr. Philbrick shows conclusively that where a gardener pays at the rate of twenty-five cents per 1,000 gallons, or even much less, only crops approaching $1,000 per acre in value will warrant the outlay. When land can be easily graded, and irrigated through canals and ditches, the yearly cost has been reduced, in some cases, as low as from one to three dollars per acre per year.

"Wherever drainage is not perfect, it must be made so before irrigation can be safely practiced; otherwise, if a heavy fall of rain should occur just after application of water, the plants might suffer seriously from being too wet."

In the discussion which followed the reading of this paper, Mr. John B. Moore said, among other things: "No crop takes the moisture out of the soil more quickly than strawberries, and, for these and other crops which soon suffer from dryness, he lets the water run down the rows all night from half a dozen large pipes."

Hon. Marshall T. Wilder then remarked that "the secret how Mr. Moore produced his large strawberries had now come out."

(In a letter recently received, Mr. Moore further states: "In the garden, I have had the best results where I have let the water run out of open hose between the rows of raspberries, strawberries, etc., always making it a rule to wet the ground thoroughly, and then stop, and not apply any more until there is good evidence of the soil needing it again. A constant drizzle is detrimental to vegetation.")

Mr. W. C. Strong said that the "even distribution of

water was very important; otherwise, the ground became sodden in places, and other parts received no benefit. He thought that considerable part of the benefit of irrigation arose from showering the foliage, especially at night, as in a green-house."

Mr. Philbrick said that he applied water in sunshine sometimes, but that in general he did not like to do so. (I would caution the reader to be very careful about wetting foliage under a hot sun, as it often causes both leaves and fruit to scald. I once lost a crop of gooseberries through a midday shower, followed by a hot afternoon.)

Mr. E. P. Richardson had found a hose perforated with holes an eighth of an inch in diameter, and about three or four inches apart, very convenient for applying water. It can be laid anywhere, in a straight or crooked line, and under plants whose leaves are injured by watering in the bright sun. Such a hose may be left for hours without attention.

In the garden at Kalamazoo already referred to, the water was obtained by damming up a spring. "The water was conveyed in a wooden conduit, made of two-inch plank, and rendered water-tight by coal tar." The whole apparatus was very inexpensive, and proves that in many instances the ingenious and enterprising horticulturist can work out a simple system of his own that, at slight cost, will answer his purpose.

This chapter aims at little more than to put the reader on the right track for further investigation, and to suggest a few of the first principles and requirements of irrigation. The great majority have little realization of the amount of water required, and very often much loss is incurred and injury caused by attempting artificial watering with an insufficient supply. Mr. Dunkley, at Kalamazoo, started with a wind-mill, but found it wholly inadequate. Partial watering is worse than useless. By liberal mulching, very much less water is required, and much longer intervals between irrigation may elapse.

If one designs to undertake irrigation upon a large scale, he should employ the services of an expert, and "make haste slowly." At the same time, many fruit farms are so located, or might be, that the laborer with a pick and shovel could solve the problem of an abundant supply of water.

When unfailing moisture can be maintained, and plants are not permitted to bear in June, nor to make runners, almost a full crop may be obtained in the autumn.

CHAPTER XXXI

SUGGESTIVE EXPERIENCES FROM WIDELY SEPARATED LOCALITIES

IT is often said that there is no teaching like experience, and in view of this sound principle I am led to quote from a few of the letters that I have received. These statements, from successful and intelligent cultivators, throw side lights on the preceding pages from various standpoints. I would advise the reader to note carefully the adaptation of different varieties to different parts of the country. As we have just been discussing the subject of irrigation, I will first quote from California letters, since they touch on this topic.

From Mr. James Shinn's interesting communication, I take the following facts:

"NILES, ALAMEDA CO., CAL.

"The greater part of the strawberries consumed in San Francisco are grown in the neighborhood of San Jose, some fifty miles south of the city. We are situated about halfway between, in the great valley that borders the bay of San Francisco. We have occupied this place over twenty years, and have made observations upon the culture of small fruits, and have always grown more or less ourselves. While, therefore, I do not claim to be authority on the points you inquire about, I feel pretty safe in mentioning one or two things in this connection, that I can hardly be mistaken about.

"*First*—Those who plant extensively for market make it a *sine qua non* to have at hand plenty of water; except

in very favored localities, they can't be grown to profit without this essential. I know that the plants are planted on each side of a small ridge, previously thrown up for the purpose. The vines along the ridge stand twelve to fifteen inches apart. The space between the ridges allows three and a half feet for cultivation and water. The water is allowed to run between these ridges, and, of course, wets the roots effectually. It will be perceived that the ground must be nearly level. I cannot tell how often these rows are watered, but frequently. The proper season for planting is as early in the winter as the ground can be put in order—from November 1st, all winter—the earlier the better. If planted early, a fair crop of berries may be expected the next summer. For many years the Longwood's Prolific and Peabody Seedling were the varieties generally grown. Recently some other varieties have been introduced, but are mostly confined to the hands of amateurs. The Monarch of the West has, however, certainly secured a strong foothold among the large growers. This berry commanded a much larger price in the market than the old varieties. I just remark respecting irrigation that, of course, as you will see, the object of planting upon ridges is to place the vines so high that when the water is let in, the berries will be above its reach. Nearly all our large growers let their fields to Chinamen, who do all the work, boarding themselves, for half the net proceeds.

"San Jose, Cal.

"In answer to your letter, asking about irrigation, I would state that in the first place we grade the land, after first plowing and harrowing it. We do not like to do too much grading. If the land is very uneven, we make the rows conform to it, bringing the water on the highest portions, and cutting escape ditches through the low parts, so that the water can run off readily. The rows are made three feet apart, and every alternate row is shovelled or plowed out to make a shallow ditch about three or four inches

deep. Soil is thrown on or between the alternate rows, making the ground look like small beds. The plants are set in rows about six inches from the edge of the ditches. We are now ready for the water, which is nearly all taken from artesian wells. The first year, the plants do not require so much moisture; but the second year, we water about once a week. We keep all runners cut off.

"J. H. OGIER."

"BROWN'S VALLEY, YUBA CO., CAL.

"My business is raising strawberries and blackberries for market, which is eleven miles distant, and I send all my fruit by stage. I have experimented with all leading varieties, since Orange Judd introduced the *Agriculturist*, but succeed best with Triomphe de Gand, Longworth's Prolific, Jucunda, and Colonel Cheney. The latter is rather soft to carry so far to market. I commence sending to market about the middle of April. About the middle of June the Triomphe begins to ripen a second crop. Last year they were the largest and finest berries I ever saw. In September the Jucunda bears a third crop. From May until October we depend entirely on irrigation. Our soil is red, stiff, and heavy. I use abundantly well-rotted stable manure and barnyard compost. I prepare by deep plowing, and then harrowing. I then go over the ground for the plants with Hexamer's pronged hoe, making the soil very fine. I set the plants two feet apart each way, and where each one is to grow, I work in a large shovelful of manure deeply and thoroughly. I give blackberries the same mode of culture, setting them three feet by eight. No winter protection is needed. In ordinary seasons, there are a few strawberries all winter long. Strawberries and blackberries are very productive, and enormous in size, but currants, gooseberries, and red raspberries do not succeed in this region, the long and intensely hot and dry season being unfavorable. JOHN PALMER."

"New Castle, Cal.

"The President Wilder is the finest flavored berry we have ever tasted, and it is the most attractive in color of all. The Jucunda does not do well on our light soil. The Monarch is splendid. We grow raspberries quite extensively, our climate and location being better adapted to them, perhaps, than any other part of California. The earliest berry with us is the Red Antwerp (probably the English). It is a week earlier than the Franconia. The Herstine is a fine berry every way, except as regards firmness. The cap varieties are inferior in flavor here.

"C. M. Silva & Son."

From other sources I learn that the Triomphe de Gand and Seth Boyden are among the chief favorites in California.

Mr. Felix Gillet, Nevada City, Cal., author of an excellent little treatise on the culture of the strawberry in his region, says: "The row and hill system is certainly the best of all, especially to raise large, fine fruit. The rows should be two feet apart, or thirty-six inches, if irrigating by running water in each row as it is done in California. The plants should be set, the large-growing sorts two feet from each other in the row, the smaller ones from twelve to eighteen inches."

"Austin, Texas.

"I put in water-works, and it is the best investment I ever made. I supply Austin with vegetables the whole year round. It was very dry last year, but I loaded three wagons with vegetables every day. We watered twenty acres regularly, and will water thirty this year. I am making a large reservoir on a hill, which will be supplied from a large well through a six-inch pipe. I use Knowles's steam pump, 30 horse-power, capable of pumping 750,000 gallons daily. Of strawberries, the Kentucky Seedling can stand the most heat and drought. Crescent Seedling looks well here, also the Forest Rose. Raspberries, currants, and gooseberries cannot be raised. We plant strawberries one foot apart in

the row, and the rows are three feet apart. We mulch early in spring, and cultivate by horse-power after the bearing season is over. I regard cow manure, leaf mould, and bone flour as the best fertilizers. I consider fall, October or November, as the best time for planting.

"WILLIAM RADAM."

"PALESTINE, TEXAS.

"The Charles Downing, Seth Boyden, and President Wilder have done well. The Charles Downing has flourished as though native and to the manner born. The Kentucky has done remarkably well; the Wilson not so well. Raspberries, on the whole, have done well, but currants and gooseberries will not survive. The strawberries have done better than I hoped. I have always looked upon the strawberry as a semi-aquatic plant, and this view has been strengthened by an account of a wonderful crop produced in this region by abundant and systematic watering. The great difficulty against which we have to contend is the prolonged summer, when, for weeks, the thermometer ranges from 90° to 95° in the shade. To this must be added spells of dry weather, lasting sometimes for six or eight consecutive weeks in July, August, and September.

"D. S. H. SMITH."

"NEW ORLEANS, LA.

"Experienced cultivators prepare for strawberries by thorough plowing and subsoiling. We cultivate by subsoil plow, cultivator, and hoe, with no stones to impede our work. The bearing season lasts about 90 days. I have had two full crops in the same season. The best time to plant is, 1st, in August; 2d, in December. The Wilson and Charles Downing do well. The black-cap raspberries succeed; the red raspberries are thus far a failure. Blackberries do very well. D. M. WIGGINS,

"*Agricultural editor*, 'N. O. Times.'"

Mr. H. W. Lamb, of Colorado Springs, writes me that strawberries and the hardy red raspberries do well in his

section. They regard sheep manure as one of the best fertilizers. Dr. Samuel Hape, of Atlanta, Ga., writes:

"In reply to your favor, I would say that strawberries and blackberries do splendidly here, raspberries moderately, and currants and gooseberries as exceptions; grapes finely.

"Our soils are mostly loam, with some sand, and a clay subsoil. Bottom lands have the usual deposits of muck and partially decomposed vegetable matter. The damp, rich soil, of course, suits strawberries and blackberries; though the latter grow wild to such perfection, and in such abundance, as to do away with cultivation almost entirely. The red raspberry does not succeed very well as a rule. While damp, under-drained soil and sandy loam are best for strawberries, the dry uplands have almost invariably produced well. As to fertilizers, well-decomposed stable manure and bone meal have done the best with us.

"No winter protection is needed. The fall, with us, is the best season to transplant strawberries, by all odds—as soon as the September rains set in. DR. SAMUEL HAPE."

"JACKSONVILLE, FLA., Dec. 23, 1878.

"With pleasure, I answer your questions to the best of my ability. 1. What varieties of small fruits do best in your locality? Strawberries and blackberries do well, but owing to the abundance of wild fruit, late and early, the blackberry is not cultivated largely. No other small fruits have been fairly tried. The general opinion is that our warm weather lasts too long for the raspberry, gooseberry, and currant. I have given the raspberry a trial, and cannot recommend it. 2. What soils are best adapted to them? We have two soils on which the strawberry thrives, the low hummock bordering on the river. It is rich in vegetable and mineral matter—clay from two to four feet under surface. The next is our pine land; soil light, and of grayish color, nearly devoid of vegetable matter, but largely supplied with lime and potash. Strawberries and blackber-

ries do well on this soil. We have what is termed high hummock. It is a yellow loam, with clay, varying from two to six feet from surface. The orange, peach, grape, fig, quince and plum do well on this soil. 3. What is your mode of culture? For strawberries, I lay off beds, slightly raised, 8 feet wide. On each bed I put four rows of plants, running the full length of beds. For Wilsons, rows 18 inches, and 12 inches between plants; Charles Downing, and Seth Boyden, 18 by 18 inches. Cover all the space with pine-needles by the time warm weather sets in, and shade their fruit from the hot sun. I cultivate with a small hand cultivator, partly invented by myself, and by hoeing. 4. What fertilizer do you consider most efficient? A compost of stable manure, muck, and potash. 5. What winter protection do you give, if any? None needed. For summer protection, pine straw between plants; this answers a double purpose—to keep the fruit clean, also to protect the plants in warm, dry weather, and retain moisture. 6. Do you consider spring or fall the best season for planting in your locality? If I have home-grown plants, I prefer planting from last of August to first of December. Northern plants, unless grown in pots, do best if obtained in November or December. I will add here, for your information, Wilson's Albany is very shy of making runners for the first year or two after coming from the North. Seth Boyden and Charles Downing take possession of the ground after fruiting is over. WILLIAM JAMES."

Mr. P. J. Berkmans, the well-known horticulturist of Augusta, Ga., informed me that the Kentucky, Charles Downing, and Crescent endured the southern sun well, and that the Captain Jack and Sharpless were fine with them; all the purple cane and black-cap raspberries did well, but none of the foreign kinds thrived. Mr. Berkmans remarked that, even after ten years of bearing, he hesitated to express a positive opinion concerning a fruit, so great are the differences caused by location and soil. It is your

young men that have been two or three years in the business, who have positive opinions on every subject.

In the suburbs of Savannah, Ga., I found three-quarters of an acre of strawberries that had yielded a clear profit of $800 in one season. The preparation and culture for this profitable crop were as follows: A good coat of manure was spread early in spring and plowed under. Cow-peas were then sown and plowed under in August, when another coat of manure was harrowed in. Planting was commenced August 10, and the plants set fourteen inches from each other, in beds with alleys between, twenty-eight inches wide. They were worked with a cultivator, mulched with pine straw in January, and stimulated from time to time with liquid manure. The fact that they secured a good home market accounts, in part, for the large profit.

Through the courtesy of Captain Sigwald, himself a successful horticulturist, I was able to visit many strawberry plantations in the vicinity of Charleston, S. C., and will give a few statistics from one of the most flourishing. The plants were vigorous, and the long rows clean and free from runners. The best plants had been set out in the preceding September. The force employed to set five and a half acres was: five hands taking up the plants with a large patent transplanter, that brought away a ball of earth with the roots; five more laborers "toting," or carrying on hand-barrows, the plants from the propagating bed to the fruiting field, and four planting. The expense of planting was $15 per acre. From the five and a half acres, there were shipped to New York 15,200 quarts, on which the freight, at fifteen cents per quart, amounted to $2,280. Commission on sales was $413—leaving a balance of only $1,670, and out of this all other expenses had to come. Thus it way be seen that the expense of marketing the crop was greater than the expense of growing it and the net profit combined—a condition of things that should not last. The freight has been reduced to ten cents per quart this year, I understand.

The Monarch seems peculiarly adapted to East Tennes-

see, and Mr. Ed. S. Sheppard, who first introduced them, found a sensation resulting that in its proportions resembled the mammoth berry.

The Crystal City and Captain Jack are favorite varieties in Missouri.

For the latitude and climate of New York, and westward, much suggestion has been given already.

Mr. J. T. Lovett, of Little Silver, N. J., gives the following list as the best selection for their light sandy soils:

FOR THE HOME GARDEN

Strawberries

French's Seedling—best early crop.
Charles Downing—best medium, or main crop.
Kentucky—best late.

Red Raspberries

Herstine—best early.[1]
Turner—best entirely hardy early.
Cuthbert—best medium and late.

Black-cap Raspberries

Doolittle's Improved—best early.
Mammoth Cluster—best medium and late.

Mammoth Blackberries

Wilson's Early—best early.
Kittatinny—best main crop.

Currants

Cherry—best red.
Red Dutch—best for culinary purposes.
White Grape—best white.
Victoria—best late.
Black Naples—best black.

Gooseberries

Downing

FOR MARKET—OF VALUE IN THE ORDER NAMED

Strawberries

Wilson's Albany, } For shipment.
Captain Jack, }
Crescent Seedling, }
Charles Downing, } For near market.
Downer's Prolific, }

Red Raspberries

Cuthbert.
Brandywine.

Black-cap Raspberries

Mammoth Cluster.
Doolittle's Improved.

Blackberries

Kittatinny.
Wilson's early.[2]

Currants

Cherry.
Red Dutch.
Black Naples.

Gooseberries

Downing.
Houghton Seedling.

[1] "Requires winter protection to ensure a crop."

[2] "In former years this was the most profitable of all sorts, but latterly it is so frequently injured by winter, and so generally attacked by disease or insects throughout the State, as to render it uncertain."

In the Sixth Annual Report of the New Jersey State Board of Agriculture, I find the following interesting statement from the well-known horticulturist, Mr. P. T. Quinn.

"ONE ACRE OF STRAWBERRIES.

"NEWARK, October, 1878.

"The following are the methods of culture and the products of one acre of strawberries, grown on my farm near Newark, during the season of 1878. The ground on which these strawberries were grown was planted with Early Rose potatoes and heavily manured in the spring of 1877. These potatoes were dug and marketed during the last week in July and first week in August of the same year. The ground was at once cleared off, plowed and harrowed smoothly. Furrows were then opened four or five inches deep and two and a half feet apart. Between the 15th and 22d of August, 1877, the strawberry plants were set in these furrows from fifteen to eighteen inches apart, without any manure being added. Some plants died here and there, but the bulk of those set out made a strong growth before cold weather. They were kept free from weeds by running a cultivator twice between the rows and hoeing twice. This treatment kept the ground absolutely free from weeds. In the middle of December, the plants were covered over with a compost of the sweepings of the vegetable and fish markets, with some horse manure mixed through it. The whole was thoroughly decayed and light in character. About the middle of April, 1878, the coarsest part of this mulch was raked off the strawberry plants, and left in the spaces between the rows, the finer portion being left among the plants. To the coarse part raked off was added salt hay, pressed under the leaves of the plants on either side of the rows, enough being added to keep the soil around the plants moist and the fruit free from grit. There was no disturbance of the soil in any way in the spring, beyond the cutting off at the surface of a few straggling weeds that started up here and there.

"The varieties grown upon this acre were Charles Downing and Green Prolific, and the yield was five thousand four hundred and eighty-seven (5,487) quarts. The gross receipts from this acre of berries was seven hundred and ninety-five dollars and sixty-one cents ($795.61). Deducting the commissions and picking the fruit, the net returns were $620.60."

Messrs. Gibson and Bennett, of New Jersey, stated before the Western New York Horticultural Society, that they "liked the bedding system, say four-row beds, with plants one foot apart each way and two-feet walks between the beds. We fertilize with fine horse manure, spreading it heavily and plowing it under. We start plants in pots and transfer them to the beds in September, the earlier the better. These potted plants form fine large crowns ready for the finest fruit. The beds are covered with manure January 1. The fruit is picked the following June, and the beds then plowed under at once and planted with other crops."

By this system, it will be seen that the plants occupy the ground but about ten months, and little or no cultivation is given. It is practically the same method as that employed around Charleston, S. C., and, I am inclined to think, could often be practiced at the North with great profit. In contrast, Mr. J. K. Sharpless said, on the same occasion, "We grow in the hill system, and expect the plants to last four or five years;" adding, "My experience teaches me that strawberries should not be cultivated deeply until their season of rest is over, say the last of August." I think this view sound.

Mr. E. B. Underhill, of Poughkeepsie, N. Y., said that he "valued the Golden Defiance for late fruit. The Glendale is more vigorous. I think highly of the Champion and Kentucky. The Duncan is our best early of those well tested. As the mid-market in this section will probably be glutted with Crescents, I shall take great pains with the Cumberland Triumph, which, picked in pints (on account

of its softness), will yield almost as well, and bring more dollars than any sort I have tested yet."

From Mr. Frank S. Alling I learn that all the small fruits succeed finely on the shores of Puget Sound, Washington Territory.

I will close this chapter of experiences with a very interesting letter from the Rev. Mr. A. A. Von Iffland, of Quebec, who gives an admirable statement of the conditions of success in the latitude of Northern Canada. It will be seen that his light, warm soil makes a difference of several degrees of latitude in his favor.

"My soil is of a light gravelly nature, with a subsoil of coarse sand. It requires annual applications of large quantities of manure to bring about the best results, but *then* yields generous returns. It is warm and quick, and so porous that it can be worked almost immediately after the heaviest showers. Plants form roots in the soil with marvellous rapidity. All kinds of vegetables can be successfully cultivated. Potatoes, tomatoes, squash, corn, carrots, parsnips, melons, cucumbers, beans, and peas are grown to perfection. Of course, it is liable to suffer severely in a drought—an evil which I find is best obviated by plenty of barnyard manure and cultivation. The climate is doubtless severe, and the winters long, but the abundance of snow affords the best kind of protection and is of the greatest possible advantage in the culture of small fruits. Winter sets in with us sometimes as early as the first of November, sometimes not till the middle of December, and the snow has not disappeared from the vicinity of the fences till the last week in April. The average depth of snow is 4½ feet, and we have cold spells of three or four days at a time, when the glass varies between 20 and 30 degrees below zero.

"STRAWBERRIES

"I think that all the varieties which are cultivated in the United States can be cultivated here under the same condi-

tions of soil. I grow successfully the Colonel Cheney, Triomphe de Gand, Wilson, Charles Downing, Nicanor, Green Prolific, Monarch of the West, Seth Boyden, but have discarded Jucunda and Kentucky. I have the greatest success with the Cheney, Charles Downing, Wilson, and Triomphe, in the order written. I plant both in fall and spring, but prefer fall setting when it can be done early and you have good plants.

"I used to strike plants in three-inch pots, but have abandoned that plan, and instead, lay the runners as early as I can get them (from 1st to 20th July), and when well rooted, set them out, with a ball of earth, from 15th to 20th August. If the season is at all moist, so that the young plants make good progress before the frosts set in (about middle of October), I get a good crop (half a full crop) the following summer. From plants set in the spring, I take no fruit. With this exception, fall and spring settings are treated alike. As the cultivation is all done by hand, I have found that planting in beds of three rows each combines the greatest advantages. The rows are 15 inches apart, and the plants 18 inches apart in the row—in the quincunx form; each bed is separated from the rest by a path 30 inches wide. I need not say that the soil has been previously well enriched—with compost, generally, and well-decomposed manure. In fact, as I usually plant on soil from which a crop of potatoes has been removed, the ground has received two applications the year the plants are set. As the Colonel Cheney is my favorite, in order to fertilize it, I plant alternate beds of some good staminate variety, Charles Downing, Triomphe, or Wilson. The cultivation of the young plants the first season consists in cutting off any runners that may form, and keeping them clear of weeds. When well established, the beds are top-dressed with an inch or two of old manure; this feeds the plants, keeps the soil about the roots moist, and acts as a mulch when the fruit sets, and yields the following summer. The following spring and summer, nothing is done to these beds

till after fruiting, except to hoe out the weeds. After fruiting, a thorough weeding is effected, and the runners are cut every three weeks; and before the frosts set in, the beds are given a top-dressing of old manure. After the second crop of fruit is taken off, they are weeded, and the runners are allowed to strike. The third spring, wood-ashes are applied; and after fruiting the plants are turned under. No winter protection is given to the plants, unless you except the top-dressing of manures; but this is sometimes not applied till spring, and I observe no appreciable difference between the plants with and those without it. What I do observe is that an early winter, and plenty of snow, kills fewer plants than a winter in which the snowfalls have been delayed till after frosts and rains.

"Strawberries begin to ripen with us about the 28th of June, and raspberries about the 15th of July. With the above treatment, I have grown Wilsons and Cheneys at the rate of 11,000 quarts, or 344 bushels, to the acre.

"RASPBERRIES.

"I prefer fall planting, which may be done as late as they can be put in. I have set them the last day of October, without losing one. I plant them four feet apart, but five would be better, and tie the canes, when grown, to stakes four and a half feet high.[1] Sometimes I have laid them down, and sometimes have tied up the young canes to the stakes in the fall, and I find but little difference. They always bear, and are never winter-killed.

"As to blackberries, I have but little experience. That blackberries will succeed here, some canes I saw 15th August, in a friend's garden, some two miles from my house, afford ample proof. They were loaded with clusters of magnificent, large, luscious fruit, and were equally prolific last year. My friend told me he was obliged to give them

[1] "The following fall, of course; when planted, the canes are cut back, so as to be only six inches above ground."

very warm protection—literally bury them in straw and earth.

"Red and black currants grow well with us, under ordinary treatment. Gooseberries, however, are liable to mildew; that is, the English varieties. The native hybrids, of course, are safe enough. Still, under some conditions, I have seen the English varieties without a touch of mildew. My English varieties mildewed badly this summer, and the man from whom I got them says that he has never seen it in his garden, not far from me. I went to see his bushes, and there was not a sign of mildew affecting his gooseberries, which were very large and fine."

CHAPTER XXXII

A FEW RULES AND MAXIMS

SUGGESTIVE experiences and the methods of successful men are usually far more helpful than a system of rules. Nevertheless, I have thought that some concise maxims and formulas would be of use to those not yet well versed in the labors of a fruit farm. Such rules, also, may be of service to the unfortunates who are dependent on the "hired man," since they can be copied and given to this minister of destiny whose hands work out our weal or woe so largely. There are two types of workmen that are incorrigible. The one slashes away with his haphazard hoe, while he looks and talks in another direction. His tongue, at least, is rarely idle, and his curiosity awakes when he does. If any one or anything goes by, he must watch it while in sight and then comment and expectorate. He is not only versed in all the coarse gossip concerning his neighbors, but also can talk by the hour of the short-comings of even their horses and dogs. The virtues of man or beast, however, make but little impression on what answers in his organism for a mind. That which is good, wholesome, and refined interests him no more than strawberries would a buzzard. To the degree that he is active, he usually makes havoc. The weeds do not suffer seriously from his efforts, but if you have a few choice plants, a single specimen or two of something unpurchasable and rare, or a seedling that you dream may have a future, the probabilities are that, unless watched and warned, he will extirpate them utterly. It rarely happens that you can teach this

type of man better things. The leopard may change his spots and the Ethiopian his skin, but this man—though resembling both outwardly, through his uncleanliness—never changes. His blunders, garrulity, and brainless labor, however, would transform Izaak Walton himself into a dragon of irritability. The effort to reform such a man would be heroic, indeed, but let those who enter upon such a task give their whole souls to it, and not attempt gardening at the same time—unless the garden is maintained for the sake of the man, and they, in their zeal, approach Titania in her midsummer-night's madness, when she bade her attendant fairies to "feed" the "translated" weaver—

> "With apricocks and dewberries,
> With purple grapes, green figs, and mulberries."

This degenerate descendant of Bottom, however, needs no such considerate attention; he will help himself to the choicest and rarest.

Scarcely better than the type portrayed above is the deliberate workman, who can soon show you how easy it is to spend two dollars in order to make one. His wages—the one thing he is prompt about—will leave little margin of profit on the berries that he has packed, although, by reason of his ancient pipe, they may outrank all the fruit in the market. This man never walks nor runs, no matter how great the emergency and press of work; he merely jogs around, and picks a raspberry as he would pry out a bowlder. He does his work fairly well, usually; but the fact that it would require a hundred such men to care for a small place causes not the slightest solicitude. He would smoke just as stolidly and complacently after bringing wreck and ruin to a dozen employers.

Men of these types are as disastrous on a fruit farm as the *Lachnosterna* or currant worm. Unless the reader has far more native goodness and acquired grace than the writer, he had better dismiss them speedily, or his feelings may resemble those that Sam Jubilee described on page 155. I

have given two extreme examples, but there are also gradations of these characters, who had better find employment from those requiring "hands" only. Successful work on a fruit farm, or in a garden, requires a quick brain, a keen eye, a brisk step and a deft hand. Many of its labors are light, and no profit can follow unless they are performed with despatch, at the right time and in the right way.

The majority of those we employ wish to do right and to give satisfaction. They are not only willing but are glad to learn; and while only actual and long-continued experience can make a thorough gardener, perhaps the following rules, maxims, and principles, embodying the experience of others, may be of service to beginners, giving them a start in the right direction:

1. Never put off till spring work that might be done in the fall. Spring is always too short for the labor it brings, even when not wet and late.

2. Plow in the fall all heavy, loamy land that you intend to plant in spring. This exposes it to the action of frost, and if done late, tends to destroy insects and their larvæ. Do not plow sand in the fall unless there is upon it sod, stubble, etc., that is to decay.

3. Top-dress very light land with an inch or two of clay or heavy loam in November, and let the winter frosts and rains blend the two diverse soils to their mutual advantage. Harrowing in fertilizers on light ground is better than plowing them in.

4. In the fall top-dress all the small fruits with compost, bone-dust or other fertilizers that have staying powers, spreading it along close to the rows and over the roots, and working it into the soil lightly by cultivation. This gives everything a vigorous start in the spring.

5. If possible, take out before winter all perennial weeds —sorrel, white clover, etc.—but do not greatly disturb the roots of strawberries, just on the approach of winter.

6. In most localities and soils, raspberries, currants, gooseberries, and blackberries do better if planted any time

after they drop their foliage in the fall. Such planting can be continued even into the winter, on mild, still days, when frost is neither in the air nor soil. Frozen earth should never come in contact with roots. I plant strawberries, also, all through the autumn, even into December; and before the ground freezes, hoe upon them one or two inches of soil, raking it off as soon as freezing weather is over in the spring.

7. The earlier plants are set out in spring, the better, if the ground and weather are suitable. It is usually best to wait till the danger of severe frost is over. Do not plant when the ground is wet and sticky, or dry and lumpy, at any season, if it can be helped. Do not plant in a high, hot or cold wind. Make the most of mild, still, and cloudy days. If plants can be set before a storm or shower, much is gained; but this is not essential if roots are imbedded their whole length in moist (not wet) earth, and the soil made very firm around them. Plantings may be made in very dry weather if the land is forked or plowed late in the afternoon, and the plants set immediately in the fresh, moist earth. Keep the roots from contact with unfermented manure.

8. In handling plants at any time, *never* let the *little* rootlets dry and shrivel. Keep them from sun, frost, and wind. If the roots of plants received in boxes are frozen, let them thaw out in a cellar undisturbed. If roots are black, shrivelled, or musty from long transportation, wash them in clean water, and, in the case of strawberries, shorten them one-third, and then plant at once in moist soil.

9. In cultivating strawberry plants recently set, stir the surface merely, with a rake, *not over half an inch deep.*

10. Never disturb roots by working among them in dry weather. At such times, stir the *surface only, and often.*

11. If you water at all, water thoroughly, and keep the soil moist till rain comes; otherwise watering is an injury.

12. The easiest and cheapest way to keep a garden clean is to rake the ground over once a week on sunny days. This

method destroys the weeds when they are just appearing, and maintains moisture.

13. Pick fruit, if possible, when it is dry, and before it is over-ripe. Do not leave it in the sun or wind, but take it at once to coolness and shade. Pack carefully and honestly. A quart of small, decayed, green, or muddy berries scattered through a crate of fine fruit may reduce its price one half.

14. Mulch everything you can. Save all the leaves and litter that can be gathered on the place, and apply it around the plants only when the ground is moist. *Dry* ground covered with mulch may be kept dry all summer.

15. Practice summer pinching and pruning only when plants are in their spring and early summer growth, and not after the wood begins to ripen. If delayed till then, wait till the plant is dormant in the fall.

16. Sandy or gravelly land can usually be worked immediately after rain; but if heavy land is plowed or cultivated when wet, or so dry as to break up in lumps, it is injured.

17. Watch all crops daily. Plants are living things, and need attention. Diseases, insects, drought, or wet may destroy them in a few days, or even hours, if left uncared for.

18. If you cultivate strawberries in the spring, do the work *very early*—as soon as the ground is dry enough to work. After the fruit buds show themselves, stir the ground with a rake or hoe only, and never more than an inch deep. I advocate early spring cultivation, and then the immediate application of the mulch.

19. Just as the ground begins to freeze, in the fall or early winter, cover strawberry plants with some light material that will prevent alternate freezing and thawing during the winter. Never use heavy, unfermented manure for this purpose. Leaves, straw, salt, hay, *light* stable manure, or any old litter from the garden, answer.

20. In setting raspberry plants, or any fruit, never set in hard, unprepared soil. Do not stick them in little, shallow holes, nor in deep, narrow ones, wherein the roots are all

huddled together; make the holes large and deep, either with the plow or spade, fill the bottom partly with fine, rich, moist, surface soil, free from lumps and manure, and *spread* the roots out on this, then fill in with very fine pulverized earth, setting the plant, in light land, one or two inches deeper than it grew naturally; and in heavy land at the same depth. If manure is used, spread it on the surface, *around*, not up against, the stem of the plant.

21. Both for the sake of economy and thoroughness, use the plow and cultivator rather than fork and hoe, whenever it is possible. Ground can be laid out with a view to this rule.

22. In cultivating crops among trees, use short whiffletrees, with the traces so fastened as to prevent the young trees from being scratched and wounded.

23. Save, with scrupulous economy, all wood-ashes, soapsuds, and all articles having fertilizing qualities. A compost heap is like a sixpenny savings bank. Small and frequent additions soon make a large aggregate. The fruit-grower and his land usually grow rich together, and in the same proportion.

24. Once more I repeat—in handling and setting out plants, *never* let the roots shrivel and dry out. After plants and cuttings are in the ground, never leave them just long enough to dry out and die. Keep them moist—not wet and sodden, but *moist* all the time. In setting out plants, especially strawberries, spread out the roots, and make the ground *very firm* about them. In trenching stock, put the roots down deeply, and cover well half-way up the stems. The gardener who fails to carry out the principles under this number has not learned the letter A of his business.

Mr. William Parry gives the following rule for ascertaining the number of plants required for one acre of land, which contains 43,560 square feet:

"Multiply the distance in feet between the rows by the distance the plants are set apart in the row, and their prod-

uct will be the number of square feet for each plant or hill, which, divided into the number of feet in an acre, will show how many plants or hills the acre will contain, thus:

"Blackberries . . .	8 feet	by	3	=	24)43,560(	1,815 plants.
Raspberries . . .	7 "		3	=	21)43,560(	2,074 plants.
Strawberries . . .	5 "		1	=	5)43,560(	8,712 plants.
Strawberries . . .	3 "		16 in.		4)43,560(	10,890 plants."

The same rule can be applied to all other plants or trees.

I would suggest that fruit-growers take much pains to secure trustworthy pickers. Careless, slovenly gathering of the fruit may rob it of half its value. It often is necessary for those who live remote from villages to provide quarters for their pickers. Usually, the better the quarters, the better the class that can be obtained to do the work.

CHAPTER XXXIII

VARIETIES OF STRAWBERRIES

TO attempt to describe all the strawberries that have been named would be a task almost as interminable as useless. This whole question of varieties presents a different phase every four or five years. Therefore I treat the subject in my final chapter, in order that I may give revision as often as there shall be occasion for it, without disturbing the body of the book. A few years since, certain varieties were making almost as great a sensation as the Sharpless. They are now regarded as little better than weeds, in most localities. Thus the need of frequent revision is clearly indicated. In chapter thirteen I have spoken of those varieties that have become so well established as to be regarded as standards, or which are so promising and popular as to deserve especial mention. More precise and technical descriptions will now be given. I shall not copy old catalogues, or name those kinds that have passed wholly out of cultivation. Such descriptions would have no practical value, and the strawberry antiquarian can find them in the older works on this subject. Neither shall I name many foreign kinds, as the majority of them have little value this side of the Atlantic. Soil, climate, locality, and other reasons, cause such great differences in opinion in regard to varieties that I expect exceptions to be taken to every description. Many of the new sorts that I am testing have not, as yet, proved themselves worthy of mention.

Agriculturist.—Originated with the late Mr. Seth Boyden,

of Newark, N. J. Through the courtesy of an old friend of Mr. Boyden, I am able to give his description of his own berry, copied from his diary by a member of his family:

"No. 10.—Name, Agriculturist. A cross between No. 5 and Peabody's Georgia; a hardy, tall grower, with much foliage and few runners; berries very large, broad shoulders, slightly necked, often flat, and some coxcombed or double, high crimson color to the centre· very firm, and high-flavored. A staminate variety."

(No. 5 is the Green Prolific.) The Agriculturist was once very popular, and is still raised quite largely in some localities, but is fast giving way to new varieties. It is peculiarly adapted to light soils, but on my place has scalded and "dampened off" badly. It seemingly has had its day.

Boyden's No. 30 (*Seth Boyden*).—I again let Mr. Boyden describe his own seedling:

"Plant above medium size; round leaf, deep green; bears the summer heat well; berries necked, rather long, large; abundance of seed; dark red; has buds, blossoms, and ripe berries on the same peduncle; is of the Agriculturist family, and an eccentric plant. Perfect flower."

From the reference above, I gather that No. 5, or Green Prolific, is one of the parents of this famous berry. Mr. Boyden speaks of some of his other seedlings more favorably than of this—another instance of the truth that men do not always form the most correct judgments of their own children. No. 30 will perpetuate Mr. Boyden's name through many coming years, and all who have eaten this superb berry have reason to bless his memory. No. 5 and No. 10 are rapidly disappearing from our gardens. The Boyden (as it should be named) is one of the largest and sweetest berries in cultivation—too sweet for my taste. It responds nobly to high culture, but it is impatient of neglect and light, dry soils. It is one of the best market berries,

and although not hard, is firm and dry, and thus is well adapted for shipping. It is one of the few fancy berries that will endure long transportation by rail. As I have stated, Mr. Jerolemon has raised 327 bushels of this variety on an acre, and received for the same $1,386. Give it moist soil and cut the runners.

Bidwell.—Foliage light green, plant very vigorous; truss 3 to 5 inches high; berry very conical, bright scarlet, with a neck highly glazed, glossy; flesh firm, pink; calyx close; season very early.

Not yet fully tested, but giving remarkable promise. It has seemed to me to be the best of the new early berries. Staminate.

Beauty.—Plant fairly vigorous, leaf crinkled; truss 4 to 6 inches high; berry obtusely conical; long, glazed neck; crimson, 3 to 6 inches in circumference; flesh light pink; flavor excellent; calyx spreading; season early—a very fine and beautiful variety for the amateur and fancy market. It requires petting, and repays it. It makes very few runners. It originated with Mr. E. W. Durand, of Irvington, N. J. Staminate.

Black Defiance.—Plant vigorous, if the soil suits it; foliage dark green, low, bushy; downy leaf-stalk; truss low; 2½ to 4 inches; berry very dark crimson; very obtuse conical, often round and irregular; early, flesh dark crimson, flavor sprightly, high, and rich; moderately productive; calyx spreading; inclined to stool; its runners bear fruit in September. It is one of the best varieties originated by Mr. Durand, who has given me the following history: "It is a seedling of Boyden's Green Prolific, impregnated by the Triomphe de Gand. The seed was planted in 1860. The berry was exceedingly tart when first red, and was on that account pronounced worthless by competent judges (so considered). Having but limited experience at the time, I threw it aside, but afterward retained five plants to finish a row of trial seedlings. Eventually it was shown at the exhibition of the New Jersey Agricultural Society, and was

awarded the first prize as the best new seedling, by such competent judges as A. S. Fuller, Dr. Thurber, and Chas. Downing." From that day to this all lovers of good fruit have indorsed their opinion. It is firm, and can be shipped long distances. Staminate.

Black Giant.—Said to be a decided improvement on the above, and to have the same general characteristics; but not yet tested by general cultivation.

Black Prince. — An old and once popular English variety, one of Keen's seedlings, now rarely grown in this country.

Brilliant.—Originated with W. B. Storer, of Akron, Ohio, who describes it as "a large conical berry; color a dark, glossy red, and deep red all through; flavor rich. Plant very hardy and prolific."

British Queen.—One of Myatt's seedlings, of which Mr. J. M. Merrick writes: "It is perhaps the most famous berry ever raised in England, where it is a favorite for market." Unfortunately, it does not come to full perfection here, and is not only tender but very capricious in choice of soils. It is the parent of many excellent kinds. The fruit is of the largest size and highest flavor. Staminate.

Brooklyn Scarlet.—One of the best-flavored berries, but too soft, except for home use. Originated with Mr. A. S. Fuller. Staminate.

Boston Pine.—Once a favorite in the vicinity of Boston, and largely used to fertilize Hovey's Seedling. But few are raised now, to my knowledge. Fruit quite large; slightly conical; deep, glossy crimson; rather firm; juicy, and of good flavor. The plant requires hill culture in rich soil. Staminate.

Burr's New Pine.—A medium-sized, roundish berry; scarlet in the sun; pale in the shade; juicy, sweet, aromatic, early, very soft. Pistillate.

Belle.—One of Mr. J. B. Moore's seedlings. New. I give an extract from the Massachusetts Horticultural Society's report: "The Belle, we think, is the largest straw-

berry ever exhibited on our tables." As yet, not generally tested.

Captain Jack.—Plant moderately vigorous; leaf-stalk smooth, wiry; very dark green foliage, which in many regions is inclined to burn; truss 5 to 7 inches; recumbent; very much branched, with from 12 to 18 berries; berry light scarlet, round, fair size and uniform; flesh pink, moderately firm; flavor poor; calyx close; season late; very productive; flowers grow above the leaves; the fruit endures transportation remarkably well; staminate. Originated with Mr. S. Miller, of Bluffton, Mo., and is a seedling of the Wilson.

Charles Downing.—Plant very vigorous; foliage light green; tall and slender; leaf-stalk downy; truss 6 to 7 inches, slender, drooping; 8 to 10 berries, which are scarlet, with a pale cheek—crimson when fully ripe; berry round to obtuse conical; regular, the first slightly ridged; somewhat soft; flesh juicy, light pink; flavor very fine; size 3 to 5 inches in circumference; calyx spreading and recurved; season medium; very productive.

This is one of the best family varieties, and is planted every year more largely for market. With care, it endures transportation very well, and those who once taste it ask for it again. There are few, if any other, varieties that do so well throughout the country at large. Originated with Mr. J. S. Downer, Fairview, Ky. Staminate.

Champion.—Plant vigorous; foliage dark green; leaf-stalk downy; truss 5 to 6 inches, branched; berry dark crimson, round; flesh rather soft, crimson; flavor very good when fully ripe, but poor when it first turns red; size 2½ to 5 inches; calyx recurved; season medium to late; exceedingly productive. One of the best and most profitable for near market. Originated with Dr. J. C. Neff, Carlisle, Pa. Pistillate.

Caroline.—Plant a moderate grower; foliage light green; leaf-stalk somewhat downy; truss 4 to 5 inches; berry bright scarlet, with a varnished appearance; bulky, conical; flesh

scarlet; flavor good; size 3 to 4 inches; calyx spreading; season medium. Originated with J. B. Moore, Concord, Mass. Staminate.

Crescent Seedling.—Plant vigorous, tall, with dark green and very slender foliage; leaf-stalk rather smooth; truss 6 to 8 inches, well branched; bearing 12 to 18 berries; bright scarlet berry, round to conical, with a peculiar depression near the apex; large ones somewhat irregular; size 2 to 4 inches; flesh scarlet; flavor not good, unless grown on light land and the berry ripens in the sun; calyx recurved. Soft for long carriage; but its bright color and fair size, under good culture, cause it to sell readily in near markets. I think the public will demand better-flavored berries. It certainly should. There are few weeds that can compete with the Crescent in vigorous growth. It does well in the hot climate of the South. Indeed, there are few soils so poor and dry that it cannot thrive upon them; and, at the same time, under high culture, with runners cut, it improves wonderfully. It has yielded at the rate of 15,000 quarts to the acre. Originated with Mr. William Parmelee, of New Haven, Conn., in 1870. Pistillate, or nearly so.

Centennial Favorite.—Plant vigorous, tall, with light green foliage; truss 3 to 7 inches, much branched; berry dark scarlet, round to flat, inclined to have a neck, 2 to 4 inches; smooth and glossy in appearance, uniform in size, flesh dark scarlet; flavor fine; calyx spreading; season medium to late; moderately productive. Originated with Mr. E. W. Durand, Irvington, N. J. Pistillate.

Cinderella.—Plant very vigorous, with light green foliage; leaf-stalks soft, downy; truss 4 to 6 inches; berry conical, sometimes necked, bright scarlet, glossy; flesh moderately firm, light pink; flavor fair, but not high; size 3 to 5 inches; season early to medium; calyx spreading.

The young plants are not very productive, but I think they would improve greatly in this respect if the runners were cut, and that they would bear better the second year. The berry is almost as beautiful and attractive as the

Jucunda, which it resembles somewhat; and it can be grown on light soils, where the Jucunda cannot thrive. Originated with Mr. Oscar Felton, of New Jersey, 1873. Staminate.

Continental.—Plant vigorous; leaf-stalk smooth; truss 5 to 7 inches, well branched, bearing 12 to 18 berries; berry dark crimson, obtusely conical; flesh firm, scarlet; flavor good; calyx recurving; season late; moderately productive, and, under hill culture, very prolific. Originated with Mr. Oscar Felton. Staminate.

When visiting Mr. Felton, I saw several other seedlings of great promise, which I hope he will send out at an early date.

Colonel Cheney.—Plant low, spreading, vigorous, with light green foliage; leaf-stalk downy; truss 3 to 5 inches, low, branching; berry light scarlet, long, conical, necked; large ones very irregular; flesh pink, watery, soft; the core tends to pull out with the hull; flavor poor; calyx spreading; season medium to late; very productive, and Mr. A. M. Purdy, editor "Small Fruit Recorder," writes to me that for near markets it is still grown with great profit in western New York. Pistillate.

Crimson Cone.—(Scotch Runner or Pine-apple). About fourteen years ago, according to Mr. Fuller, there were more acres of this old-fashioned variety cultivated for the New York market than of all other kinds together. They were also called "Hackensacks," and were brought in the small, handled baskets already described, and were hulled as they were picked—their long neck making this an easy task. They are small, regular, conical, firm, with a rich, sprightly, acid flavor. It is not a pistillate, as many claim, Mr. Fuller asserts, but a spurious variety, largely mixed with it, is a pistillate. It is one of the historical strawberries, but it has had its day. In size and flavor it is a near approach to the wild berry.

Cumberland Triumph.—Plant vigorous, with dark green foliage; leaf-stalk smooth; truss 6 to 7 inches; well

branched; berry round and very uniform in shape, pale scarlet; flesh light pink, soft; very large; size 3 to 6 inches; calyx close; season early to medium.

One of the best for family use. Under high culture, it is superb. Originated with Mr. Amos Miller, of Carlisle, Pa. Staminate.

Damask Beauty.—Foliage very dark green; leaf-stalk downy; truss low, 2½ to 4 inches, berry very light scarlet obtusely conical; size 2 to 4 inches; flesh soft, juicy, pink; flavor fine; calyx close; season early.

A very distinct variety, and interesting to an amateur, but of no great value. Staminate.

Duchesse.—Plant vigorous, tall; leaves dark green; leaf-stalk and midrib very downy; truss 7 inches; recumbent, well branched, 6 to 8 berries that hold out well in size; berry round, bulky, very uniform, moderately firm; bright scarlet; flesh pink, juicy; flavor fine; size 3 to 4 inches; season very early, but continuing quite long. Inclined to stool, or make large plants from a single root; enormously productive; from 50 to 200 berries to a plant, in hill culture. I regard it as the best early standard berry, and have always found it one of the most profitable for market. Originated with Mr. D. H. Barnes, of Poughkeepsie, N. Y. Staminate.

Duncan.—Plant vigorous; foliage light green; leaf-stalk downy; truss 5 to 7 inches; berry scarlet, round to oval, often decidedly conical; large ones irregular, and cox-combed, flesh pink, not very firm; flavor very good; calyx close to spreading; a productive, fine variety, that, I am inclined to think, has not been appreciated. Originated by Mr. J. G. Lucas, of Ulster Co., N. Y. Staminate.

Doctor Nicaise.—A French variety; enormously large; soft; not productive; and on my grounds wretched in flavor.

Downer's Prolific.—A light scarlet berry; medium to large; oval, roundish, soft; acid, but of good flavor, and perfumed like the wild berry. Plant very vigorous and capable of enduring much neglect; profitable for home

use and near market. Originated with Mr. J. S. Downer, of Kentucky. Staminate.

Dr. Warder.—Plant tall, moderately vigorous; foliage light green; leaf-stalk downy; truss 7 to 9 inches, branched, full of different-sized berries; berry long, conical, well shouldered, crimson, firm; flesh pink; flavor good; size 4 to 6 inches; calyx close; season very late; burns badly, needs to be in shade. Staminate. A superb variety if it did not lose its foliage.

Early Hudson.—Plant very vigorous, with light green foliage; leaf-stalk downy; truss 4 to 5 inches, strong, well branched; berry crimson, flattish-round; when large, somewhat irregular; flesh crimson, juicy, soft; size 3 to 5 inches; season very early; very productive. One of the best for family use, and very productive and fine, with runners cut. Pistillate.

Eliza.—Plant moderately vigorous; dark green; leaf-stalk downy; truss 3 to 5 inches, stout, branched; berry light scarlet, round to conical, necked, large ones irregular and coxcombed; flesh firm, white; flavor excellent; calyx close; season late; moderately productive. One of the best foreign varieties. Staminate.

Early Adela.—Not worth growing on my grounds.

French's Seedling.—Plant vigorous, with light green foliage; leaf-stalk downy; truss 5 to 7 inches; berry round, scarlet; size medium; seeds deep-pitted; flesh pink, soft; flavor good; calyx spreading; season early; moderately productive. Found growing wild in a meadow, near Morristown, N. J.

Forest Rose.—Plant moderately vigorous; foliage light green; truss 3 to 5 inches, branching; berry bright scarlet, large, and the first somewhat irregular, 4 to 6 inches; flesh light pink; flavor very fine; calyx spreading and recurving; season early.

One of the best where it can be grown, but in some regions the foliage burns. Discovered growing in a vineyard, by Mr. Fetters, of Lancaster, Ohio. Staminate.

Frontenac.—Foliage light green; plant moderately vigorous; leaf-stalk wiry; truss 5 inches, 6 to 8 berries; berry bright scarlet, roundish and slightly irregular; size 2 to 3 inches; flesh pink, solid; season late; moderately productive; the foliage is inclined to burn.

Glendale.—This variety is now greatly praised as a market berry. Dr. Thurber and I examined it together, and agreed that its flavor was only second-rate; but, as we have already seen, the public does not discriminate very nicely on this point. It averages large, sometimes exceeding six inches in circumference. It is long, conical, uniform in shape, necked. The first berries are often ridged somewhat, but I have never seen it flat or coxcombed. It has a very large calyx, is light scarlet in flesh and color, very firm, and therefore will probably keep and ship well, the large calyx aiding in this respect also. The plant is vigorous and makes a long runner before the new plant forms. Leaves large and dark green; leaf-stalk downy; truss 4 to 6 inches; season very late. Found, by Mr. W. B. Storer, growing wild in Glendale Cemetery, Akron, O., in 1871. Staminate. I think this berry has a future as a market variety.

Green Prolific.—One of the late Mr. Seth Boyden's noted varieties, and a parent of far better berries than itself. I quote again from Mr. Boyden's diary: 'No. 5; a cross with Hovey's Seedling and Kitley's Goliath; a large plant, and seldom injured by summer heat; very luxuriant grower and bearer; berries above medium size and of good quality. A pistillate."

This berry was once very popular, but has been superseded. The fruit is very soft, and second-rate in flavor. The plant is so vigorous and hardy that, in combination with a fine staminate, it might be the parent of superior new varieties.

General Sherman.—New. Described as "large, conical, regular, brilliant scarlet; quality good, productive; early."

Great American.—Plant but moderately vigorous; foli-

age dark green; leaf-stalks downy; truss 4 to 7 inches; berry dark crimson, round to conical; under poor culture, 2 to 3 inches in size, but sometimes very large, 10 to 12 inches; flesh pink; flavor only fair; season late; unproductive, unless just suited in soil and treatment. In most localities, the foliage burns or scalds in the sun, and also seems just adapted to the taste of the flea-beetle and other insects. Originated with Mr. E. W. Durand, and under his exceedingly high culture and skilful management it yielded immense crops of enormous berries that sold as high as a dollar per quart; but throughout the country at large, with a few exceptions, it seems to have been a melancholy failure From this variety was produced a berry measuring over fourteen inches in circumference—probably the largest strawberry ever grown. Staminate.

Golden Defiance.—Plant tall, very vigorous, somewhat slender, light green; leaf-stalk moderately downy; truss 5 to 7 inches, 12 to 20 berries, well clustered—all the berries developing to a good size; berry dark scarlet, obtusely conical, smooth, sometimes necked, very uniform, 3 to 5 inches; flesh scarlet, quite firm, juicy; flavor very fine; calyx spreading and recurving; season late.

For three successive years this has been the best late berry on my place, and one of the most beautiful. Unless it changes its character, it will win its way to the front rank in popularity. If its runners are cut, it is exceedingly productive of fruit that is as fine-flavored as showy. Pistillate. Originated with Mr. Amos Miller, of Pennsylvania.

Glossy Cone.—One of Mr. E. W. Durand's seedlings. A pretty berry, with a varnished appearance, but neither productive nor vigorous on my grounds, thus far. New.

Helen.—New. Plant tall, vigorous, with dark green foliage, very downy; truss 5 to 7 inches, branched; berry light scarlet, flat, conical; flesh white, firm; flavor fine; calyx close; season late. I fear the foliage is inclined to burn badly. Staminate.

Hervey Davis.—New Plant tall, rather vigorous, with

light green foliage; leaf-stalk smooth, except when young; truss 5 to 6 inches; berry bright scarlet, shouldered, obtusely conical, glossy; flesh very light pink, firm; flavor good; calyx close; season medium; productive. It has seemed to me the most promising of Mr. J. B. Moore's seedlings. The berry resembles the Jucunda somewhat. Staminate.

Hovey's Seedling.—One of the most famous of the historical berries, and still raised quite largely around Boston. It was originated by Mr. C. M. Hovey, and was first fruited in 1835. Its introduction made a great sensation in the fruit world, and the fact of its being a pistillate gave rise to no end of discussion. Many who first bought it set it out by itself, and of course it bore no fruit; therefore they condemned it. When its need of fertilization was understood, many used wild plants from the woods for this purpose, and then found it to be the largest and most productive strawberry in cultivation at that period. Such large crops were often raised that the theory was advanced by many that pistillates as a class would be more productive than staminates, and horticulturists became as controversial as the most zealous of theologians. The berry and the vexed questions that it raised have both ceased to occupy general attention, but many of the new varieties heralded to-day are not equal to this old-fashioned sort. Mr. Downing thus describes it: "The vines are vigorous and hardy, producing moderately large crops, and the fruit is always of the largest size and finely flavored; the leaves are large, rather light green, and the fruit-stalks long and erect; fruit roundish-oval and slightly conical, deep shining, scarlet, seeds slightly imbedded; flesh firm; season about medium."

Huddleston's Favorite.—New. Thus described by E. Y. Teas, of Dunreith, Ind.: "A vigorous grower, with large, glossy foliage, that stands the sun well; berries of the largest size, round, with small calyx, of a bright, glossy, crimson color, ripening evenly, firm, with a rich, spicy flavor; late; very beautiful in appearance."

Jucunda.—A slow rather than feeble grower, on heavy soils; light green foliage; leaf-stalk smooth; truss 5 to 7 inches; berry high-shouldered, conical, of a bright, glossy crimson, very showy; flesh scarlet, firm; flavor fair and good when fully ripe; calyx close; season late.

I am indebted to Dr. Hexamer for the following history: "The late Rev. Mr. J. Knox, of Pittsburgh, told me that in a bed of what he received as Bonté de St. Julien, he found a number of plants that seemed to him a new variety. Supposing them to be a new and very desirable seedling, he separated them from the others and propagated them under the name of '700.' Before he offered them for sale he discovered that they were identical with the Jucunda, and when they were brought out, in 1865, it was under the true name, Jucunda (Knox's 700)." One authority states that it originated in England, with a Mr. Salter; another says that it was imported from Belgium. This is of little consequence compared with the fact that it is the finest foreign berry we have, on *heavy* soils. I do not recommend it for light land, unless the runners are cut and high culture is given. Mr. M. Crawford, of Cuyahoga Falls, Ohio, makes the interesting statement that Mr. Knox "sold over two hundred bushels of this variety in one day, at $16 per bushel." It has always been one of the most profitable on my heavy land. The young plants are small and feeble. Staminate.

Kentucky Seedling.—Plant tall, vigorous, but slender and apt to fall; light green foliage; truss 8 to 10 inches, with 8 to 10 berries; berry scarlet, conical, high-shouldered, somewhat flattened at the tip, regular in shape and uniform in size, a little rough, knobby, with seeds set in deep pits; flesh but moderately firm, and very white; flavor of the best; calyx spreading and recurving; season late and long-continued; very productive—one of the very best; size 3 to 4½ inches. It succeeds well on light soils and under the Southern sun, and improves wonderfully under hill culture. Staminate. Originated by Mr. J. S. Downer, of Kentucky.

Lady of the Lake.—Plant tall, vigorous, dark green foliage; leaf-stalk downy; truss 7 to 8 inches; berry crimson, conical necked; flesh pink, firm; flavor good, but rather dry; size moderate; calyx spreading; season medium; productive. Staminate.

It has been, and is still, a favorite with the market-men around Boston. Originated by a Mr. Scott, in Brighton, Mass.

La Constant.—One of the most beautiful of the foreign berries; flesh rosy white, sweet, juicy, very firm, and of exquisite flavor. The plants are dwarf and compact, and they require the highest culture. Even then the crop is uncertain; for the variety, like high-born beauty, is very capricious; but its smiles, in the way of fruit, are such as to delight the most fastidious of amateurs. Originated by De Jonghe. Staminate. It is one of the favorite varieties abroad for forcing.

Lady's Finger.—An old variety, now not often seen. Conical, and very elongated, and of a brilliant, dark scarlet color. It was once popular, but has been superseded.

Lennig's White (White Pine-apple).—This is not strictly a white berry, for it has a delicate flush if exposed to the sun. The flesh is pure white, juicy, melting, sweet and delicious in flavor, and so aromatic that one berry will perfume a large apartment. The plant is vigorous and hardy, but a shy bearer. Hill culture and clipped runners are essential to fruit, but, for a connoisseur's table, a quart is worth a bushel of some varieties. It is the best white variety, and evidently a seedling of the *F. Chilensis.* It originated in the garden of Mr. Lennig, of Germantown, Pa. Staminate.

Laurel Leaf.—New. Plant moderately vigorous; foliage dark green; leaf-stalk quite smooth; truss 3 to 5 inches, low, stocky; berry very light scarlet; round to conical, short neck; flesh soft, light pink; size moderate; flavor good; calyx close. Originated with Mr. A. N. Jones, Le Roy, N. Y. Staminate.

Longworth's Prolific.—An old variety, that is passing out

of cultivation; still grown quite extensively in California. It is a large, roundish-oval berry of good flavor. The plant is said to be vigorous and productive. Originated on the grounds of the late Mr. N. Longworth of Cincinnati.

Longfellow.—New. Described as very large, elongated, conical, occasionally irregular; color dark red, glossy and beautiful; flesh firm, sweet, and rich; plant vigorous with dark green, healthy foliage, not liable to burn in the sun; very productive, continuing long in bearing, and of large size to the last. Originated with Mr. A. D. Webb, Bowling Green, Ky.

Marvin.—This new berry is already exciting much attention, and I am glad that I can give a description from so careful and eminent a horticulturist as Mr. T. T. Lyon, President Michigan State Pomological Society: "From notes taken at the ripening of the fruit: 'Plant vigorous, very stocky, of rather low growth, bearing a fine crop for young plants; foliage nearly round, thick in substance, flat or cupped; serratures broad and shallow; fruit large to very large, longish conical; large specimens often coxcombed; bright crimson; began to color June 16, and the first ripe berries were gathered on the 20th; stems of medium height —strong; flesh light crimson; whitish at the centre, firm and juicy; flavor high, rich, fine, with a very pleasant aroma; seeds prominent; greenish brown. We regard this as a highly promising, very large, late variety, and especially so for market purposes. Staminate.' "

Originated with Mr. Harry Marvin, Ovid, Mich., and said to be from the Wilson and Jucunda—an excellent parentage.

Miner's Great Prolific.—Plant vigorous; leaves light green, smooth; leaf-stalk downy; truss six inches, well branched, slender, drooping; berry deep crimson, round and bulky, regular shouldered; tip green when half-ripe; flesh pink, moderately firm; flavor good; calyx spreading; size four to five inches; season medium to late. The berry holds out well in size, and resembles the Charles Downing

somewhat, but averages larger. It has seemed to me as promising a new variety as the Sharpless. I believe it has a long future. Originated with late T. B. Miner in 1877. Staminate.

Monarch of the West.—Plant very vigorous; leaves light, when young, and later of a golden green, somewhat smooth; truss six inches; four to eight berries; berry often of a carpet-bag shape, square shouldered, and sometimes coxcombed, large, magnificent; pale scarlet; flesh light pink, tender; flavor very fine; calyx spreading and recurving; tip of berry green when not fully ripe, but it colors evenly if given time. When flavor is the gauge of excellence in the market, this famous berry will be in the front rank. Its color and softness are against it, but its superb size, deliciousness and aroma should make it eagerly sought after by all who want a genuine strawberry. In the open market, it already often brings double the price of Wilsons. In the home garden, it has few equals. With some exceptions, it does well from Maine to California. The narrow row culture greatly increases its size and productiveness. I have had many crates picked in which there were few berries that did not average five inches in circumference. Mr. Jesse Brady, of Plano, Illinois, gives me the following history: "The Monarch was raised by me in 1867, from one of a number of seedlings, grown previously, and crossed with Boyden's Green Prolific. The said seedling was never introduced to the public. I raised fourteen, and cultivated three of them several years. They were produced from an English berry, name unknown to me."

Martha.—A fine, large berry, but, as I have seen it, the foliage burns so badly that I think it will pass out of cultivation unless it improves in this respect. Staminate.

Neunan's Prolific (Charleston Berry).—Foliage tall, slender, dark green; fruit-stalk tall; berries light scarlet, inclined to have a neck at the North, not so much so at the South. First berries large, obtusely conical; the latter and smaller berries becoming round; calyx very large and droop-

ing over the berry; exceedingly firm—hard, indeed—and sour when first red; but growing richer and better in flavor in full maturity; usually a vigorous grower. It was originated by a Mr. Neunan, of Charleston, S. C., and scarcely any other variety is grown in that great strawberry centre.

Napoleon III.—A very large foreign berry, often flattened and coxcombed. I found that its foliage burned so badly I could not grow it. Mr. P. Barry describes the plant as "rarely vigorous, and bearing only a few large, beautiful berries."

New Jersey Scarlet.—An old-fashioned market berry that succeeded well on the light soils of New Jersey. Once popular, but not much grown now, I think. Mr. Downing describes it as medium in size, conical, with a neck; light, clear scarlet; moderately firm, juicy, sprightly. Staminate.

Nicanor.—A seeding of the Triomphe de Gand, that originated on the grounds of Messrs. Ellwanger & Barry, and is described by Mr. Barry as "hardy, vigorous, productive, early, and continuing in bearing a long time; fruit moderately large; uniform, roundish, conical; bright scarlet; flesh reddish, rather firm, juicy, sweet; of fine flavor." I found that it required heavy soil, high culture, with clipped runners, to produce, on my place, fruit large enough to be of value. The fruit ripened very early and was of excellent flavor. Staminate.

New Dominion.—Described by Mr. Crawford, as "very large, roundish, uniform in size and shape; bright red; glossy, firm, of good flavor, and productive; season medium." I have seen it looking poorly on light soil. Originated with Mr. C. N. Biggar, on the battlefield of Lundy's Lane.

Oliver Goldsmith.—New; a very vigorous grower, bearing a long, conical berry with a glazed neck. Untested, but very promising. Staminate.

President Lincoln.—Plant moderately vigorous; foliage light green; truss 5 to 6 inches, strong; berry crimson,

conical; often long with a neck; the first large berries are coxcombed and very irregular; flesh firm, scarlet; flavor of the very best; size 3 to 6 inches; calyx close to spreading. One of the best varieties for an amateur. Among them often, without any apparent cause, are found small bushy plants with smaller leaves, and berries full of "fingers and toes." These should be pulled out. The variety evidently contains much foreign blood, but is one of the best of the class. The berries almost rival the Sharpless in size, and are better in flavor, but the plant is not so good a grower. Specimens have been picked measuring over eleven inches in circumference. It is said to have originated with a Mr. Smith, of New York City, in 1875. Staminate.

President Wilder.—In the estimation of many good judges, this is the most beautiful and best-flavored strawberry in existence—an opinion in which I coincide. It has always done well with me, and I have seen it thriving in many localities. It is so fine, however, that it deserves all the attention that it requires. It is a hybrid of the La Constant and Hovey's Seedling, and unites the good qualities of both, having much the appearance of the beautiful foreign berry, and the hardy, sun-resisting foliage of Hovey's Seedling. It has a suggestion of the musky, Hautbois flavor, when fully ripe, and is of a bright scarlet color, deepening into crimson in maturity. Flesh quite firm, rosy white, juicy, very rich and delicious. The berry is diamond-shaped, obtusely conical, very regular and uniform; seeds yellow and near the surface. The plant is low, compact, rather dwarf, the young plants quite small, but the foliage endures the sun well, even in the far South. The plants are more productive the second year of bearing than in the first. Young plants often do not form fruit buds. Mr. Merrick states that it "originated with President Wilder, in 1861, and was selected as the best result obtained from many thousand seedlings in thirty years of continual experimenting." Staminate.

Pioneer.—Plant vigorous; foliage light green, tall; leaf-

stalk downy; truss 5 to 7 inches; berry scarlet, necked, dry, sweet, perfumed; flesh pink, only moderately firm; flavor of the best; calyx close to spreading; season early. This seems to me the best of all Mr. Durand's new varieties that I have seen, and it is very good indeed. The foliage dies down during the winter, but the root sends up a new, strong growth, which, I fear, will burn in the South and on light soils. Staminate.

Prouty's Seedling.—Plant not very vigorous; leaf-stalk very smooth; truss 3 to 5 inches; berry bright scarlet, glossy, very long conical; flesh pink, firm; flavor fair; calyx close. Very productive, but the plant does not seem vigorous enough to mature the enormous quantity of fruit that forms. With high culture on heavy soil, I think it might be made very profitable. Staminate.

Panic.—Mr. W. H. Coleman, of Geneva, writes me that this variety promises remarkably well in his region, but on my ground it burns so badly as to be valueless. It is a long, conical berry, very firm and of good flavor. Staminate.

Red Jacket.—Early, high-flavored, with a rich subacid, suggesting the wild berry in taste and aroma; of good size, round, dark crimson. Plant vigorous; a promising new variety. Staminate.

Russell's Advance.—A fine-flavored, early variety, but the plant proves not sufficiently vigorous and productive to compete with other early berries already described. Staminate.

Russell's Prolific.—A fine, large berry, deservedly popular a few years since. It has yielded splendid fruit on my grounds, but it seems to have proved so uncertain over the country at large as to have passed out of general favor. It is rather soft for market and not high-flavored enough for a first-class berry. Pistillate.

Romeyn's Seedling.—I cannot distinguish it from the Triomphe de Gand. Staminate.

Sharpless.—A very strong, upright grower, with large, crinkled foliage; truss 5 to 8 inches, strong branched; 6 to

10 large berries often on each; berry carpet-bag in shape, and often very irregular and flattened, but growing more uniform as they diminish in size; light red and glossy, 5 to 7 inches; flesh firm, light pink; flavor fine, sweet, perfumed; calyx recurving; season medium. One of the very best if it proves sufficiently productive over the country at large.

Mr. J. K. Sharpless kindly writes me: "I have been much interested in growing strawberries for the last fifteen years, and after being disappointed in many of the new and highly praised varieties, the idea occurred to me that a seedling originating in our own soil and climate might prove more hardy and long-lived. Having saved a fine berry of each of the following varieties—the Wilson, Colonel Cheney, Jucunda, and Charles Downing—I planted their seeds in a box in March, 1872. The box was kept in the house (probably by a warm south window), and in May I set from this box about 100 plants in the garden, giving partial shade and frequently watering. By fall, nearly all were fine plants. I then took them up and set them out in a row one foot apart, protecting them slightly during the winter, and the next season nearly all bore some fruit, the Sharpless four or five fine berries. It was the most interesting employment of my life to grow and watch those seedlings. Some of the others bore fine, large berries, but I eventually came to the conclusion that the Sharpless was the only one worthy of cultivation." I am inclined to think that the Jucunda and Colonel Cheney formed the combination producing this berry. It is now in enormous demand, and if it gives satisfaction throughout the country generally, its popularity will continue. It is peculiarly adapted to hill culture, and the plant is so vigorous that it would develop into quite a bush on rich, moist land, with its runners clipped. Staminate.

Seneca Chief.—Plant vigorous and productive; large, downy leaf; truss low; berry bright scarlet, glossy, occasionally a little wedge-shaped; round to conical, shoul-

dered; flesh firm, pink; seeds yellow and brown; flavor fine, rich subacid; season medium; size 3 to 5 inches; calyx close; a fine berry, originated by Messrs. Hunt & Foote, Waterloo, N. Y. Staminate.

Seneca Queen.—Plant vigorous, foliage dark green; leaf-stalk moderately downy; truss 3 to 5 inches; berry dark crimson, round; flesh red; flavor fair; size 3 to 5 inches; calyx close; season medium; productive; a promising variety. Staminate.

Springdale.—Plant low, stocky; leaf-stalk downy; leaf broad and smooth; truss 3 to 4 inches; berry bright scarlet, round, broader than long, 3 to 5 inches; flesh light pink, juicy, rather soft; flavor very good; calyx close; season early to medium. Originated by Amos Miller, of Pennsylvania. Pistillate.

Sucker State.—Plant seems vigorous; foliage dark green; leaf-stalk downy; berry light scarlet; flesh pink, juicy, firm. A new and promising variety. Staminate.

Starling.—Only moderately vigorous; foliage low, light green; leaf-stalk downy; truss 3 to 5 inches, well branched; berry crimson, ovate, very uniform, somewhat necked; moderate-sized, 2 to 3 inches; flesh pink, very firm; flavor of the best; calyx close to spreading; season medium to late. The foliage burns so badly in most localities that this variety will pass out of cultivation. Pistillate.

Triomphe de Gand.—Plant light green; leaf-stalk and blade unusually smooth, truss 4 to 5 inches, berry, the average ones, round to conical, large ones irregular and coxcombed; light scarlet; glossy; flesh pink, juicy, and solid; flavor of the best; calyx close; size 3½ to 5 inches; season long; rather feeble grower, and comes slowly to maturity. Admirably adapted to the narrow row system, and on heavy soils can be kept in bearing five or six years, if the runners are cut regularly. If I were restricted to one strawberry on a heavy, loamy soil, the Triomphe would be my choice, since, on moist land with high culture, it will continue six weeks in bearing, giving delicious fruit. When

well grown, it commands the highest price in market. It is probably the best foreign variety we have, and is peculiarly adapted to forcing. It is said to be a Belgian variety. Staminate. The old-fashioned belief that strawberries thrived best on light soils caused this superb berry to be discarded; but it was introduced again by Mr. Knox, who proved, by a very profitable experience, that heavy land is the best for many of our finest varieties.

Triple Crown.—Plant tall, slender; foliage light green; leaf-stalk wiry, smooth; truss 5 to 6 inches; berry dark crimson, conical; when large, irregular, with a glazed neck; flesh crimson, remarkably firm; flavor rich and fine; size 3 to 4 inches; season medium; very productive. One of the best, and I think the firmest strawberry in existence. I may be mistaken, but I think this berry will become exceedingly popular when it becomes better known. I am testing it on various soils. For canning and shipping qualities, it has no equal, and though so exceedingly firm, is still rich and juicy when fully ripe. Originated by Mr. Wm. Hunt, of Waterloo, N. Y. Staminate.

Warren.—Described as very large, roundish, conical; very regular in shape and size; color dark red, ripening evenly; flesh firm and of good quality. Plant a luxuriant grower and a good bearer. New and untested. Originated by Mr. A. S. Webb, Bowling Green, Ky.

Wilding.—Plant tall, vigorous; foliage dark green; leaf-stalk downy; truss 6 to 8 inches; well branched; 10 to 12 berries; ripe fruit and blossoms on the same stalk; berry crimson, high-shouldered, round to conical; size 3 to 5 inches; flesh moderately firm, pink; flavor good. New and very promising. Originated by Mr. A. N. Jones, Le Roy, N. Y. Staminate.

Wielandy.—Plant vigorous, with dark green, very glossy foliage; leaf-stalk downy; truss low; berry bright scarlet, round to conical; flesh pink, soft; flavor fine; size 2 to 3 inches; season medium. New and untested, but of good promise for the home garden. Staminate.

Windsor Chief.—Said to have been originated by Mr. C A. Gardner, of Eaton County, Michigan, and to be a cross between the Champion and Charles Downing. The plants that I obtained from Mr. Gardner resemble the Champion so closely, both in foliage and fruit, that I cannot yet distinguish between the mother and daughter. This year I shall fruit both in perfection, and fear that I shall have to record a distinction without a difference.

I hope I may be mistaken. All that is claimed for the Windsor Chief is true if it is as good as the Champion, a variety that I have ever found one of the most profitable on my place. Pistillate.

ALPINE STRAWBERRIES

Alpines, White and Red.—These are the *Fragaria Vesca*, the strawberries of the ancients, and well worthy of a place in our gardens to-day. As I have already stated, they are one of the most widely spread fruits in the world; for while they take their name from the Alps, there are few mountains, where the temperature is sufficiently cool, on which they are not found, either in this country or abroad. In the high latitudes they descend into the fields, and grow wild everywhere. The berries are conical, medium to small in size, and the fruit-stalks rise above the leaves. In flavor they are good, very delicate, but not rich. The plants are very hardy, and moderately productive. Grown from the seed they reproduce themselves with almost unvarying similarity, but the young seedlings produce larger berries than the older plants. The foliage of the White variety is of a lighter green than that of the Red, but in other respects there are no material differences, except in the color.

White and Red Monthly Alpines.—Varieties similar to the above, with the exception that they bear continuously through the summer and fall, if moisture is maintained and high culture given. If much fruit is desired, all runners should be cut, and the ground made rich. We are often misled by synonymes of these old varieties, as, for

instance, Des Quatre Saisons, Mexican Everbearing, Gallande, etc. They are all said to be identical with the common monthly Alpines.

White and Red Bush Alpines.—A distinct class that produces no runners, but are propagated by dividing the roots. In other respects the plant and fruit are similar to the common Alpines. No matter how small the division, if a little root is attached, it will grow readily. They make pretty and useful edgings for garden walks, and with good culture bear considerable fruit, especially in the cool, moist months of autumn. Because, throwing out no runners, they give very little trouble, and I have ever found them the most satisfactory of the monthly strawberries. I see no reason why a good demand for them, as a fancy fruit, could not be created. Be this as it may, there are many who are sufficiently civilized to consider the home market first; and a dainty dish of strawberries on an October evening, and a wood-fire blazing on the hearth, form a combination that might reconcile misanthropy to the "ills of life." Mr. Downing states that the Bush Alpines were first brought to this country by the late Andrew Parmentier, of Brooklyn.

Wood Strawberries, White and Red.—These are the English phases of the Alpine, or *F. Vesca* species. Their fruit is not so conical as the Alpine of the Continent, or our own land, but is "roundish ovate." They are said to be rather more productive, but I doubt whether they differ materially from the other Alpines, except in form. They are the strawberries that our British forefathers ate, and are the same that the Bishop of Ely brought to the bloody Protector from his "gardayne in Holberne."

Montreuil.—Said to be an improved variety of the Alpines.

Green Alpine (Green Pine or Wood, *Fraisier Vert*).—"This variety was, by some, supposed to be a distinct species, but the appearance of the plant and fruit shows it to be a true Alpine. Berry small, roundish, depressed, greenish brown; flesh green, with a somewhat musky

flavor." (Fuller.) Mr. Downing says the berry is tinged with reddish brown on the sunny side at maturity, and that it has a peculiar, rich, pine-apple flavor.

Under the head of Alpines, one finds in the catalogues a bewildering array of names, especially in those printed abroad; but I am quite well satisfied that if all these named varieties were placed in a trial bed, and treated precisely alike, the differences between them, in most instances, would be found slight indeed, too slight to warrant a name and separate existence.

HAUTBOIS STRAWBERRIES—FRAGARIA ELATIOR

As far as I can learn, this class was more raised in former years than at present, both here and abroad. At any rate, the musky flavor of the "Hoboys" (as the term was often spelled in rural regions) has not won favor, and I rarely meet with them in cultivation. They are well worth a little space in the garden, however, and are well suited to some tastes.

Belle de Bordelaise is said to be the best variety. The berry is described by Mr. Fuller, as "roundish oval, dark, brownish purple; flesh white, juicy, sweet, with a strong, musky flavor."

Common Hautbois.—Fruit medium in size, reddish green, musky. The fruit-stalks rise above the leaves—hence the term *Hautbois*, or high wood. Not worthy of cultivation.

Prolific Hautbois—(Double bearing, and having many other synonymes).—Mr. Downing speaks highly of this variety, saying that it is distinguished by its "strong habit, and very large and usually perfect flowers borne high above the leaves. The fruit is very large and fine; dark colored, with a peculiarly rich, slightly musky flavor." Productive.

Royal Hautbois.—Said to be one of the largest, most vigorous, and productive of this class.

Mr. Merrick writes that the *Hautbois* strawberries find few admirers in the vicinity of Boston, and seem equally neglected abroad.

I am gathering these and the Alpines into trial-beds, and thus hope to learn more accurately their differences, characteristics and comparative values.

Chili strawberries are now rarely met with in cultivation. Mr. Merrick writes of them: "Although some of them are extolled for amateur culture, they are of little value. They are large, coarse, very apt to be hollow, with soft, poor-flavored flesh. They have been so thoroughly intermingled with other species that it is difficult to say of certain named kinds that they are or are not partly Chilis." True Chili, Wilmot's Superb, and the Yellow Chili are named as the best of the class.

There are very many other named strawberries that I might describe, and a few of them may become popular. Some that I have named are scarcely worth the space, and will soon be forgotten. In my next revision, I expect to drop not a few of them. It should be our constant aim to shorten our catalogues of fruits rather than lengthen them, to the bewilderment and loss of all save the plant grower. The Duchess, for instance, is a first-class early berry. All others having the same general characteristics and adapted to the same soils, but which are inferior to it, should be discarded. What is the use of raising second, third, and fourth rate berries of the same class? Where distinctions are so slight as to puzzle an expert, they should be ignored, and the best variety of the class preserved.

I refer those readers who would like to see a list of almost every strawberry named in modern times, native and foreign, to Mr. J. M. Merrick's work, "The Strawberry and its Culture."

CHAPTER XXXIV

VARIETIES OF OTHER SMALL FRUITS

I HAVE already written so fully of the leading and profitable varieties of raspberries, blackberries, currants, and gooseberries, that little more remains to be said; since, for reasons previously given, I do not care to go into long descriptions of obsolete varieties, nor of those so new and untested as to be unknown quantities in value. I am putting everything thought worthy of test in trial-beds, and hope eventually to write accurately concerning them.

RASPBERRIES

Rubus Idæus and Rubus Strigosus

Arnold's Orange.—Canes strong, branching, yellowish brown, almost smooth, and producing but few suckers. Fruit large, somewhat shorter than Brinkle's Orange, and of a darker orange color; rich in flavor. Originated with Mr. Charles Arnold, Paris, Ontario, C. W.

Antwerp (English).—See page 202.

Antwerp (Hudson River).—See pages 202–205.

Antwerp (Yellow—White Antwerp).—A tender variety that needs winter protection, good culture, and vigorous pruning; otherwise, the berries are imperfect and crumble badly in picking. The fruit is exceedingly delicate and soft, and must be picked as soon as ripe or it cannot be handled. It is much surpassed by Brinkle's Orange. The canes are vigorous and the variety is easily grown.

Brinkle's Orange.—For description, see page 218.

Belle de Fontenay.—See page 207.

Brandywine.—See page 208.

Belle de Palnau.—A French variety, that thrives in some localities. Canes are strong, vigorous, upright, covered with short, purplish spines, which are more numerous near the ground; berry large, obtuse conical, bright crimson; firm for so juicy and fine-flavored a berry; grains large. The berries were often imperfect on my place.

Catawissa.—See page 216. This variety is well spoken of by some good authorities. The fact that it bears in autumn should give it some consideration.

Clarke.—See page 220.

Caroline.—See page 221.

Cuthbert.—See pages 221–225.

Franconia.—See page 206.

Fastolff.—"An English variety of high reputation. It derived its name from having originated near the ruins of an old castle, so called, in Great Yarmouth. Canes strong, rather erect, branching; light yellowish brown, with few strong bristles; fruit very large, obtuse or roundish conical, bright, purplish red, rich and highly flavored, slightly adhering to the germ in picking." (Downing.)

French.—(Vice-President French).—Originated with Dr. Brinkle. "Canes strong, upright, spines short and stout; fruit medium to large, roundish, rich, bright crimson, large grains, sweet and very good." (Barry.) It is foreign in its parentage, and uncertain in many localities.

Herstine.—See pages 219, 220.

Hornet.—"Raised by Souchet, near Paris. Very productive. Canes very strong, vigorous, upright spines, purplish, rather stout, and numerous at the base; fruit very large, conical, often irregular, grains large, quite hairy, compact, crimson; flesh rather firm, juicy, sweet and good, separates freely." (Downing.) This variety appears to vary greatly with locality.

Kirtland.—(Cincinnati Red.)—One of the native varieties once grown largely, but now superseded. Fruit medium in size, obtuse conical, soft, and not very high-flavored.

Knevett's Giant.—Berry large, round, light crimson, adheres too firmly to the core, and often crumbles in picking, but is juicy and good. The canes are very strong and productive; spines purplish, short, scattering. An English variety.

Merveille de Quatre Saisons.—A French variety. This and the Belle de Fontenay are almost as hardy as any of our native kinds, and thus they form exceptions to the foreign sorts, which are usually tender. Good results might be secured by crossing them with our best native kinds. The canes of this variety must be cut to the ground in spring if much autumn fruit is desired. It is not equal to the Belle de Fontenay, to which class it belongs.

Naomi.—Identical with Franconia.

Northumberland Fillbasket.—An old-fashioned English variety, sometimes found in the garden of an amateur.

Pride of the Hudson.—See pages 190, 219.

Pearl, Bristol, Thwack.—Native varieties that resemble the Brandywine, but are not equal to it in most localities. They are passing out of cultivation.

Reliance.—A seedling of the Philadelphia, but judging from one year's test, much superior to it, and worthy of cultivation in those regions where the finer varieties cannot thrive. It is hardy, and will do well on light soils.

Saunders.—See page 220.

Rubus Occidentalis

For descriptions of *Davison's Thornless*, *Doolittle, or American Improved*, *Mammoth Cluster*, and *Gregg*, see Chapter XXII.

American Black.—Common black-cap raspberry, found wild throughout the United States. Too well known to need description.

American White-Cap (Yellow-Cap, Golden-Cap).—"Also scattered widely throughout the country, but not common. Those who discover it often imagine that they have found something new and rare. Berries slightly oval, grains larger

than those of the black-cap, yellow, with a white bloom. The canes are light yellow, strong, stocky, with but few spines. Propagated from the tips. It might become the parent of very fine varieties." (Fuller.)

Miami Black-Cap.—A vigorous, productive variety, found growing near the Miami River, in Ohio. The fruit approaches a brownish red in color, and is not equal to the Mammoth Cluster in value.

Philadelphia.—See page 220.

Seneca Black-Cap.—Raised by Mr. Dell, of Seneca County, N. Y. The fruit is between the Doolittle and Mammoth Cluster in size, and is later than the former; not so black, having a shade of purple, and is juicy, sweet, and good.

Lum's Everbearing, and Ohio Everbearing Black Raspberries.—Varieties that resemble each other. If a good autumn crop is desired, cut away the canes in the spring, so as to secure a strong early growth of new wood, on which the fruit is to be borne.

Golden Thornless.—A large variety of the American White-Cap, introduced by Purdy & Johnson, Palmyra, N. Y.

Florence.—A variety resembling the above.

Ganargua and New Rochelle.—See pages 220, 221.

BLACKBERRIES

In Chapter xxiv. I have described those varieties that have proved worthy of general cultivation. The Dorchester winter-killed so badly on my place, and the fruit was so inferior to that of the Kittatinny in size, that I discarded it. It is good in flavor. The Missouri Mammoth is tender and often not productive. There are new varieties that promise well, as Taylor's Prolific, Ancient Briton, Knox, Warren, Wachusett Thornless, Cro' Nest and several others. I am testing them, and do not care to express any opinion as yet, or write descriptions that would probably need considerable revision within six months.

CURRANTS AND GOOSEBERRIES

In chapters xxvi. and xxvii. may be found a description of those distinct varieties that are of chief value in this country. I find no good reason why I should fill pages with descriptions of varieties that are rarely cultivated, and which might well give place to better kinds. Eventually, I shall give the results gathered from my trial-beds, in which I am placing all the new and old varieties said to be worthy of cultivation.

CHAPTER XXXV

CLOSING WORDS

OUR ramble among the small fruits is over. To such readers as have not grown weary and left my company long since, I will say but few words in parting.

In the preceding pages I have tried to take from our practical and often laborious calling its dull, commonplace, and prosaic aspects. It should be our constant aim to lift life above mere plodding drudgery. It is our great good fortune to co-work with Nature, and usually among her loveliest scenes. Is it not well to "look up to the hills" occasionally, from whence may come "help" toward a truer, larger manhood, and then, instead of going home to the heavy, indigestible supper too often spread for those who are weary and feverish from the long, hot day, would it not be better to gather some sprays of the fruit whose mild subacid is just what the material man requires in mid-summer sultriness? The horticulturist may thrive if he will, in body and soul; for Nature, at each season, furnishes just such supplies as are best adapted to his need. She will develop every good quality he possesses, especially his patience.

As we have passed from one fruit to another, I have expressed my own views frankly; at the same time, I think the reader will remember that I have taken no little pains to give the opinions of others. Dogmatism in pomology is as objectionable as in theology. I shall be glad to have my errors pointed out, and will hasten to correct them.

As a part of this book appeared as a serial in "Scribner's Magazine," I was encouraged by words of approval from

many of the best horticultural authorities. I shall not deny that I was very glad to receive such favorable opinions, for I had much and just doubt of my ability to satisfy those who have made these subjects a lifelong study, and to whom, in fact, I am largely indebted for the little I do know. Still more am I pleased by assurances that I have turned the thoughts of many toward the garden—a place that is naturally, and, I think, correctly, associated with man's primal and happiest condition. We must recognize, however, the sad change in the gardening as well as gardeners of our degenerate world. In worm and insect, blight and mildew, in heat, frost, drought and storm, in weeds so innumerable that we are tempted to believe that Nature has a leaning toward total depravity, we have much to contend with; and in the ignorant, careless, and often dishonest laborer, who slashes away at random, we find our chief obstacle to success. In spite of all these drawbacks, the *work* of the garden is the *play* and *pleasure* that never palls, and which the oldest and wisest never outgrow.

I have delayed my departure too long, and, since I cannot place a basket of President Wilder Strawberries on the tables of my readers, I will leave with them the best possible substitute. the exquisite poem of H. H.:

MY STRAWBERRY

O MARVEL, fruit of fruits, I pause
To reckon thee. I ask what cause
Set free so much of red from heats
At core of earth, and mixed such sweets
With sour and spice; what was that strength
Which, out of darkness, length by length,
Spun all thy shining threads of vine,
Netting the fields in bond as thine;
I see thy tendrils drink by sips
From grass and clover's smiling lips;
I hear thy roots dig down for wells,
Tapping the meadow's hidden cells;
Whole generations of green things,
Descended from long lines of springs,

I see make room for thee to bide,
A quite comrade by their side;
I see the creeping peoples go
Mysterious journeys to and fro;
Treading to right and left of thee,
Doing thee homage wonderingly.
I see the wild bees as they fare
Thy cups of honey drink, but spare;
I mark thee bathe, and bathe again,
In sweet, uncalendared spring rain.
I watch how all May has of sun
Makes haste to have thy ripeness done,
While all her nights let dews escape
To set and cool thy perfect shape.
Ah, fruit of fruits, no more I pause
To dream and seek thy hidden laws!
I stretch my hand, and dare to taste
In instant of delicious waste
On single feast, all things that went
To make the empire thou hast spent.

APPENDIX

NEW VARIETIES

NEW STRAWBERRIES

The Jewell.—I quote the following description by the originators: "This new variety was raised from seed by P. M. Augur & Sons, in 1880, and is one of a lot of seedlings produced from one quart of Jersey Queen and one quart of Prince of Berries (the seed being sown together and taken from exhibition berries). The Jewell is the finest growing variety we have ever seen, producing an abundance of very large, high-colored fruit, of fine quality. Season medium, color bright red, changing to crimson when very ripe; flower pistillate; enormously productive; berry very solid and firm, promising to become the great market strawberry. The plant is robust and vigorous, and has never shown any signs of rust or blight." It has received the following high praise from Hon. Marshall P. Wilder: "The large size, good form, bright color and remarkable solidity and productiveness will make it a permanent variety for years to come."

Parry.—"All things considered, this surpasses any novelty that has appeared for many years. Fruit extra large, firm, handsome, and good; plant vigorous and productive. We can recommend it both for market and the home garden. Early to medium."—J. T. Lovett. This is high praise of a fruit produced by a rival fruit-grower, and does credit to the fairness of the writer The Parry strawberry was produced from seed of the Jersey Queen, planted in the summer of 1880 by Mr. William Parry, the veteran fruit-grower of New Jersey He thus describes it "Plant a rank, vigorous grower, clean foliage, and very productive. Berries large, obtuse conical, bright glossy scarlet, firm, and of the best quality, ripening all over at once. Blossoms perfect."

Dr. F. M. Hexamer, editor "American Garden," also speaks highly of it, as follows "The Parry has proved quite satisfactory on my grounds. The plants are very vigorous, healthy, have wintered well, and have yielded an abundant crop of large, handsome berries." It is also strongly praised by many other authorities, and has received many premiums.

Jersey Queen.—The plant is strong, stocky, and vigorous, but only moderately productive; the fruit large and beautiful. It must have high culture, and not be allowed to run, or it is not satisfactory. Pistillate.

Henderson.—Said to be moderately vigorous, producing handsome fruit of exquisite flavor. Early and perfect in flower. Not yet generally tested, but probably one of the best for amateurs.

Daniel Boone.—"Produces good crops; fruit of large size, attractive in appearance, medium quality, rather soft, and late in ripening; plant hardy and vigorous."—Charles A. Green. Further south and on light soils the foliage is said to blight. Pistillate.

Dollar.—"For beauty, firmness, and high quality has but few equals, but the foliage blights so badly at Monmouth as to greatly impair its value. However, it blossoms and fruits quite profusely in the autumn, giving us strawberries when other patches are bare of fruit. Perfect in flower."—J. T. Lovett. If the tendency to autumn bearing is so great as to enable us to secure a fair crop of berries in late summer and fall this variety is a valuable acquisition. I shall certainly give it a fair trial. Further north and on heavier soils the foliage may be entirely healthy.

Cornelia.—Highly praised by some, and declared to be unproductive by others. It undoubtedly requires high culture and runners clipped. With such treatment it promises to be one of the best *late* berries. Pistillate.

Crystal City.—Said to have been found growing wild in Missouri. I have fruited it for years, and have ever found it the earliest and one of the most delicious of berries. It is not valuable for market, but for home use, if the runners are clipped, it yields a fair crop of berries, with the genuine wild flavor.

May King.—Described as almost identical with the old Crescent, with the advantage that the flower is perfect.

Garretson.—Much is claimed for this variety. As its chief virtue it is declared to maintain a uniform size and regular form throughout a long picking season. It has been awarded several flattering premiums. Pistillate.

Old Ironclad.—One of the best early berries, produced on an exceedingly vigorous plant that is said to be more productive on the second and third years of bearing than on the first. The fruit, not the plant, closely resembles the Wilson. Perfect flower.

Vineland.—Said to be an improvement on the Kentucky, which it resembles. Perfect flower.

Indiana.—Also said to be an improvement on the Charles Downing. If it is we all want it, but we have tried improvements on the fine old standards before. Perfect flower.

Hart's Minnesota.—"I know of no variety that responds more readily to good culture than this. Under neglect the berries are small, but of a bright scarlet color, quite firm and very good. With high culture it is very large, attractive, and holds its size remarkably well. Perfect flower."—M. Crawford.

Jumbo.—Another name for the old Cumberland Triumph.

Prince of Berries.—Originated by Mr. E. W. Durand, and, like nearly all the varieties sent out by him, requiring very high culture. The fruit is large, meaty, and firm in flesh, of excellent flavor, and possessing a fine aroma. It

is a berry for the amateur to pet and enjoy upon his table, but not adapted to ordinary culture. Perfect flower.

Manchester.—Pistillate. "The Manchester has been a favorite with us, but, like most varieties, has its defects. It is deficient in flavor, is too light in color, is subject to leaf blight, and is exceedingly soft. It is necessary to pick every day in order to get it into market in good condition. We were pushed hard the past season, and did not pick the Manchester every day. The berries left the farm in apparently good condition, but our men reported that they melted on hot days like so much butter. They were often obliged to throw them away, from the fact that they were too soft to be sold. This softness, however, might have been obviated in a measure by picking more frequently. It is very productive, and the berries are of large size."—Charles A. Green. The words quoted above embody my own experience with this variety.

James Vick.—Should have been a better berry to bear so honored a name. After a thorough test I have discarded it. Nevertheless, in some localities it has proved a valuable market berry. Perfect flower.

Many others might be named, but, as far as I can learn, they have but short careers before them. If by well-doing they win their way to the front we shall all be glad to recognize their merits. The *Jessie*, and *Crawford's No. 6* promise to claim considerable attention in the future.

NEW RASPBERRIES

Golden Queen.—This new variety has a curious history. Apparently it is simply an albino of the Cuthbert, for to all intents and purposes it is this favorite berry with the exception of its color. Mr. Ezra Stokes, of New Jersey, found the parent bush growing in a twelve-acre field of Cuthberts, but is unable to say whether it is a sport or a seedling. At all events, it was taken up and propagated, and the result apparently is a fixed and valuable variety for home use. I doubt whether a white raspberry will ever find much favor in market—not, at least, until the people are sufficiently civilized to buy white grape currants. In color it is said to be a beautiful yellow; in flavor, hardiness, and vigor it is declared to be superior to its parent, which it nevertheless closely resembles.

Rancocas.—Another raspberry of New Jersey origin. It was found growing wild. Its discoverer claims that it has a sturdy upright growth, with a tendency to make branches like a miniature tree. These branches load themselves with red berries, which ripen early and nearly all together. Hardiness and other good qualities are claimed for it by the discoverer, who is the originator of the Hansel. If it is no better than this variety it is not destined to long-continued popularity in regions where better fruit can be grown.

Hansel.—Red. A variety of the wild or native type which in my grounds so closely resembled the Highland Hardy that, apart from its quality of earliness, I do not regard it of value. It is not by any means identical with the

Highland Hardy; but, having picked berries of both varieties at the same time, I could not tell them apart, either in appearance or flavor. Such berries are better than none at all, and may be grown by those who can raise no better. It is also claimed that earliness in ripening, and hardiness of plants made the variety profitable; and this, no doubt, is true in some localities.

Marlboro.—A large, showy, good-flavored, red raspberry that was originated by Mr. A. J. Caywood, of Marlboro, N. Y It has done well on my grounds, and promises finely as a market berry, as its earliness, bright color, firmness, and tendency to ripen its fruit rapidly and all together give the grower a chance to gather and sell his crop within a short period. I do not advise any one to grow only this variety, either for market or home use, for the reason that it gives too short a season. Employed to secure a succession of fruit, it is an excellent variety. I doubt whether the canes will prove hardy throughout any wide extent of country, for it evidently contains foreign blood. I think it well worth protection, however, if, in some regions, experience proves it to be not entirely hardy.

BLACK-CAPS

Of the newer black-cap varieties the *Souhegan* is the best that I have seen or have heard spoken of. I think it may be regarded as the best early type of this class of berries. The fruit is of good size and flavor, moderately firm, and wonderfully abundant. For vigor, hardiness, and freedom from disease I do not know that it is surpassed by any other kind.

The *Tyler* in my grounds resembled the Souhegan so closely that I do not think that a distinction between them is worth maintaining.

The *Centennial* promised wonderfully well at first on my place, but after two or three years developed a feebleness and tendency to disease which led me to discard it.

The *Ohio* is said to be the most valuable of all for drying purposes, for the reason that it is very firm, and retains its flavor and form better than any of the others It has been stated that but two and a half to three quarts of fresh berries will make a pound of dried fruit. I think it would be well for those who are far from market to experiment with this variety. If it is equal to the claims made for it, it can be made very profitable.

The *Nemaha* originated with Ex-Governor Furnas, of Nebraska. Charles A. Green says of this variety: "The season for ripening with the Nemaha is a trifle later than the Gregg. The berries are equally large, of better quality, equally productive and vigorous, and by far more hardy. This point of hardiness of the Nemaha, it is hoped, will make it the leading late variety, giving it preference over the Gregg." I have fruited it alongside of the Gregg on my grounds, but have failed to note any difference in fruit, cane, or season of ripening

The *Chapman*, *Hopkins*, and others have been introduced, but I fail to see why they should take the place of the fine old standard varieties already de-

scribed. For either market or home use the Souhegan (early) and Gregg (late) leave little else to be desired.

BLACKBERRIES

Of the blackberries recently introduced, *Wilson Junior* without doubt produces the largest and finest fruit, and in this respect is probably unsurpassed by any variety now in existence. But it is a child of the old Wilson's Early, and I do not believe it will prove hardy north of New Jersey. It resembles its well-known parent, but the fruit is earlier, finer, and larger, fit for use as soon as black, and sufficiently firm to carry well to market. Those who have tested it affirm that, although it yields enormously, it has not failed to perfect its crop. I should give it winter protection in this latitude.

The *Early Harvest* is said to be the best very early blackberry yet introduced. Mr. J. T. Lovett describes it as "first-class in every respect, perfecting its entire crop before any other blackberry can be gathered," and as "wonderfully prolific." It is of medium size, of good flavor, and so firm that it carries to market in excellent condition. In hardiness it is said to be second only to the Snyder and Taylor.

Taylor's Prolific is a variety that I was testing when this book was written. It has fulfilled its promise. The plants have proved hardy with me, the fruit of medium size, unusually fine-flavored, and very abundant.

In the West Mr. M. Crawford speaks of the *Stone* and especially of the *Agawam* as the hardiest of all the varieties that he had tested. They were comparatively uninjured when nearly all the others were killed to the ground.

There are other kinds which are good, but since they do not equal the varieties already named in this volume, I see no reason for keeping them before the public.

The *Industry* gooseberry has been introduced by Ellwanger and Barry, of Rochester, N. Y., who think it will "revolutionize gooseberry culture in this country." It is an English variety, but has succeeded so well in this country that it has been propagated and disseminated. It remains to be seen whether it will continue to retain its vigor and health in our climate. It is said to be unequalled for size, of fine flavor, very productive, and showing no signs of mildew.

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